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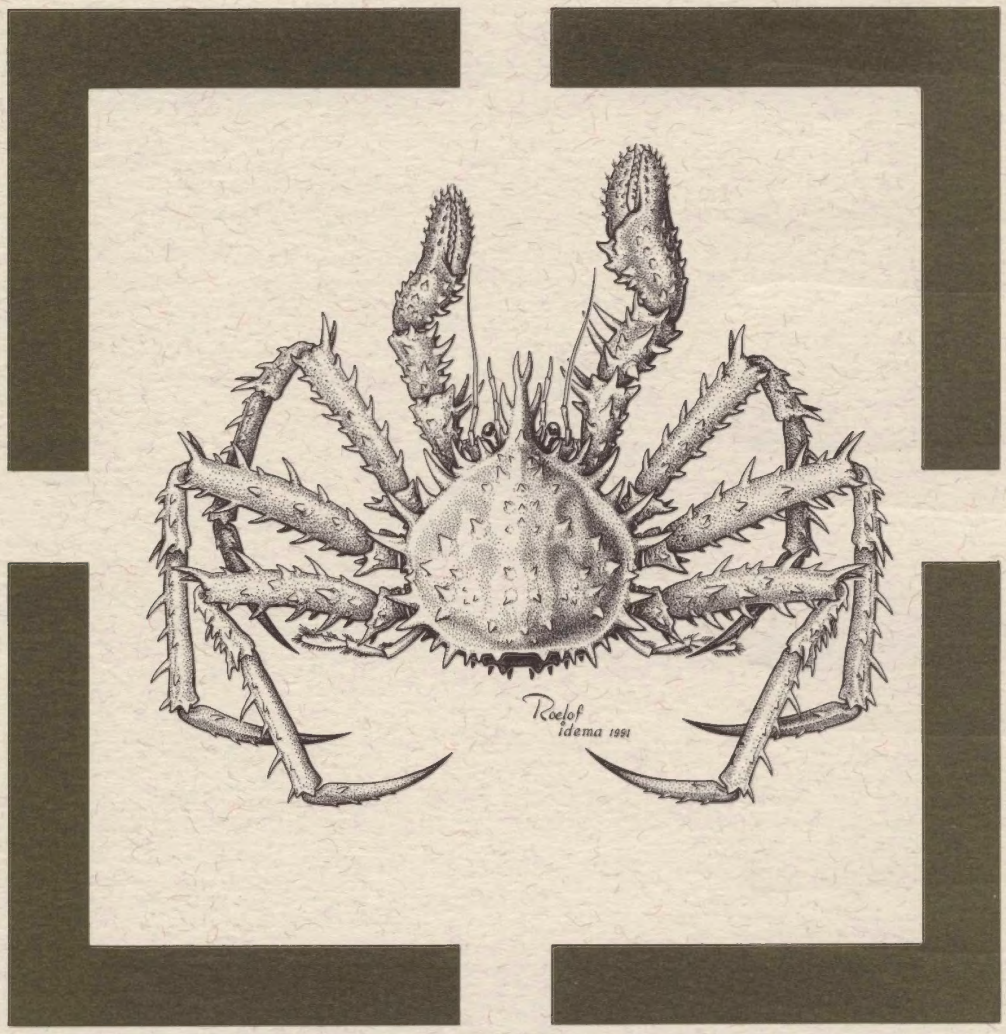

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Musée canadien de la nature

Western Yew - Precious medicine

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Western Yew, *Taxus brevifolia* Nutt., is a small unkempt evergreen tree with flat, dark, yellowish-green needles and seeds borne individually in a red cup-shaped fruit-like body. Its bark contains **taxol**, a compound with promising anti-cancer properties. Life-saving for humans, older specimens of yew are becoming rarer because of clearcutting of old-growth forests and harvesting of larger trees for taxol. The U.S. CITES office is considering listing this species as endangered by international trade.

Western Yew, also called Pacific Yew, grows in the understorey of larger conifers, as scattered individuals, preferring moist flats along streams. It ranges from California north to British Columbia and southeast Alaska, and east to Montana. The fluted trunk is often twisted or leaning. Its normal height is 5 to 8 m with a trunk diameter of 10 to 15 cm, but sometimes it reaches 14 m high or is reduced to a sprawling shrub near timberline. Large Western Yew are becoming rare as old-growth forests are cut. The horizontally spreading branches have flat or slightly drooping branchlets. The pointed needles, with a slender stalk attaching them to the twig, are yellow-green in color. The taxol-containing bark is very thin (0.5 cm thick), scaly, and dark reddish or purplish in color.

Taxol is one of the most exciting leads in cancer treatment. This compound damages cancer cells selectively without harming normal cells. In pilot tests, it has helped cancer patients with advanced breast and ovarian cancer that have not responded to other drugs. Ovarian cancer kills about 10,000 women a year in the U.S.A. and 1,000 a year in Canada. There are indications that taxol may help patients with lung cancer. Saving 5% of the persons within these three groups of cancer patients, would save 7,500 persons. A successful drug would be worth tens of millions of dollars.

But, "Supply has been a major problem," concedes Gordon Cragg, Ph.D., acting head of the U.S. National Cancer Institute's Natural Products Branch, "It takes 20,000 pounds [9,000 kg] of bark - that's 2,000 to 4,000 trees - to produce one kilogram of taxol." Six 100-year-old trees are needed to treat one patient. And the trees must be sacrificed to obtain the bark. The Institute has collected 120,000 pounds of bark in the past two years [18,000 trees]. The tree grows slowly; it can take decades for it to reach shoulder height and 250-350 years to reach maturity. So, replacement of cut trees with new ones will take many years. But cut trees may regenerate by sprouts from the stumps. Small trees yield less bark.

The demand for taxol and the low-yield of taxol per tree, bring up the problem of yew conservation. Old-growth Coast and Columbian forests harboring the yew, as well as endangered spotted owls, have been vanishing rapidly in recent decades. Attempts to synthesize the complex molecule of taxol in the laboratory for the past 15 years have so far failed. It would be wise to conserve the moist stands of large conifers in which Western Yew grows, for the sake of taxol, as well as other reasons. The yew's high shade tolerance provide it a special role in the understorey of the western rain forests of the west, where

few other trees thrive. Its presence on moist soils near lakes and rivers contributes to shoreline stability.

*The Western Yew, **Taxus brevifolia**, grows scattered in the moist understorey of old-growth west coast forests. From its bark is obtained taxol, a compound effective in treating ovarian, breast and lung cancer. The bark from six 100-year-old yews will provide sufficient taxol to treat one person. The tree grows slowly taking decades to reach shoulder height and 250-350 years to reach maturity. The wood has been used for making paddles, tool handles and bows for archers.*

The fruit-like flesh of the Western Yew was eaten by Indians who were careful to separate out the extremely poisonous seeds. Decaying leaves are particularly toxic to cattle and domestic animals. Indians prized the wood of the yew for making bows. From it they also made spoons, knives, arrowheads, fishhooks, combs and shovels, from its wood chips and fish oil, they made a red paint.

Nowadays the wood of Western Yew is of only minor commercial importance. It is used for canoe paddles, tool handles, and carving; it is still prized for bows used in archery. Hopefully the wood of those trees sacrificed to medicine will be saved for these other uses.

Dr. George Argus of the Canadian Museum of Nature suggests the Western Yew could be conserved by: 1) reduction in clearcutting of old-growth forests, 2) salvaging of specimens from clearcut areas, 3) cultivation - it is grown in some gardens in western Europe, or 4) synthesis of taxol in laboratories.

Sources

*The Nature Conservancy Magazine, January/February 1991; **Native trees of Canada** by R.C. Hosie. 1975. Canadian Forestry Service; **Identification guide to the trees of Canada** by Jean Lauriault. 1989. Fitzhenry and Whiteside, Markham, Ontario.*

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Global Environment Facility: Cornucopia or kiss of death for biodiversity

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INTRODUCTION

Last October, when the World Bank announced the launching of a billion-dollar "green fund" to support conservation work, I was reminded of the ancient Chinese curse: "May your wishes be granted."

For all of us who have fantasized about hundreds of millions of dollars to support national parks, better research, information and training....

And here, launched upon an astonished world, grown weary of complaints about insufficient funds for conservation, came the answer! The Global Environment Facility (GEF), which is managed by the World

Bank on behalf of the United Nations Environment Programme and the United Nations Development Programme, promises to provide as much as US$500 million for biodiversity over the coming three years. Similar amounts would be available for dealing with pollution, and with problems of the oceans. All our funding prayers were answered!

But wait a minute. A few details remain to be sorted out. And these details may turn this silk purse into a pig's extremity. Indeed some people fear that this funding could instead result in tremendous set-backs for the cause of conservation.

Why? The answer says much about the ways international funds for development are being spent. The GEF is a typical top-down, throwing-money-at-the-problem, dealing-with-symptoms-rather-than-causes solution to a very complex set of issues.

HOW TOO MUCH MONEY TOO QUICKLY CAN HARM BIODIVERSITY

First, no criteria have yet been established for selection of the projects. While UNEP has set up a Scientific and Technical Panel to formulate these criteria, the Bank seems determined to commit as much money as it can without waiting for such guidance. The resulting unseemly scramble has been likened to a shark feeding frenzy, as developing country governments, scientists, conservation NGOs, World Bank staffers, and everybody else jockeys for a place at the copiously bleeding carcass.

Second, as perhaps another consequence of its urgency, the Bank has argued that only by adding other elements to projects already being processed can the investments be made in time to show results within the 3-year pilot phase of the facility. The Bank is therefore favouring supplements to on-going or planned Bank investments; indeed the "topping up" of projects through GEF might make them more attractive to governments, and therefore help accelerate the approval process. But these easily-processed projects are often far from the priorities many conservationists would like to see addressed. In other words, we risk getting business as usual, only more so.

Third, the World Bank -- like other development institutions -- tends to think in terms of "projects" which have schedules, deadlines, products, foreign consultants, internal rates of returns, discount rates, and so forth. The GEF projects are in danger of suddenly injecting large sums of money to support fairly short-term, visible activities, often involving the development of infrastructure which then needs to be maintained from shrinking government budgets; such over-capitalization has often proven highly counter-productive. Most biodiversity conservation problems require solutions that are less capital-intensive, but which are implemented over many years (or even decades); solutions need to be site-specific, and modified to adapt to changing conditions; and they need to build on a reflection of local needs and perceptions, and human relationships among the interested parties. None of this adaptive process is well served by a "project approach."

Fourth, what happens to a fragile conservation institution in a developing country when

its budget is tripled overnight? For the Bank is interested only in spending large amounts of money, in the multiple-millions, because anything less is likely to impose too much cost on its own administration. But most national parks departments, universities, and research centres in developing countries have small budgets, with insufficient and poorly-trained staff. So a sudden injection of five or ten million dollars will seriously skew the shape of the institution, pulling people off existing activities and putting them to work on priorities the World Bank has considered important. The sudden arrival of substantial funding in a country could divert time and attention from other, less fundable, issues that are central to the development of national capacity to conserve biodiversity in the long term. And the indications to date are that the GEF will not support normal running costs, nor hire additional permanent staff, nor encourage the development of local NGOs that can have real impact on the ground. Like a giant cowbird, the GEF is laying a huge egg in an already skimpy nest, which harried third-world government officials must adopt, ready or not. Their own offspring may well find themselves pushed out of their nest.

Fifth, most on-the-ground conservation problems are caused by inappropriate policies at higher levels of government than by lack of local investments, so pouring more money into site-specific actions, while critical to safeguard these areas, is insufficient to lead to long-term solutions. And the presence of GEF may well reduce the pressure to redress the fundamental causes of the depletion of biodiversity. The GEF is providing plenty of funds, so what further concerns could conservationists possibly have?

And sixth, it is apparent that biodiversity conservation needs an appropriate balance between international, national, and local activities. If previous World Bank projects are indicators of how the GEF will be run, the international source of funding will strengthen central bureaucracies at the expense of the local institutions, thereby overturning years of efforts to build effective local institutions.

WHAT TO DO?

It might not be too late to modify our prayers, or at least have some influence on how they are answered. The problems suggested above are no secret -- and indeed, many thoughtful World Bank staff share the concerns conservationists have expressed. They too would like to see the GEF funds address the real issues, and avoid the pitfalls that await the unwary gift-receiver. Rather than acting as a surrogate for action to conserve biodiversity as part of regular development assistance programmes, the GEF should be used to help ensure that regular development assistance programmes contribute to the objectives of biodiversity conservation, or at least do not work against them. The following measures should be considered:

- Establish public consultation processes to give the Fund credibility with the widest range of institutions.

- Delay commitment of funds until the guiding criteria are agreed. This should be popular with the donor governments who, we may assume, do not

wish to waste their money.

- Invest in analyzing the root causes and institutional deficiencies that lead to the loss of biodiversity, with a view to identifying the kinds of interventions that can address these (such as policy dialogue, economic incentives, interest rates, commodities prices, civil service structures, training, research, and so forth).

- Ensure that the proposed GEF projects are subject to the same environmental impact assessment procedures as are other projects.

- Establish a "small grants fund" which would respond to specific requests from governments for technical assistance, training, equipment, and other short-term needs for foreign exchange; this would avoid the problem of over-capitalization.

- Work with developing countries to assess their real needs in biodiversity at national and regional levels, based on existing information and work carried out by local experts in these countries.

- Develop mechanisms for setting priorities for investment in conserving biodiversity, at the levels of species, natural systems, and critical areas.

- Support the capacity of governments to assess and monitor their own biodiversity, bringing the latest (and expensive) technology to bear on the problem.

CONCLUSION

None of the above suggestions will assuage the trepidation that many will feel about having hundreds of millions of dollars being dumped on unsuspecting conservation institutions whose budgets have tended to be in the hundreds of thousands, or even less. A sudden and short-term flow could do far more harm than good, leading the developers to conclude that investing in conservation was a poor idea.

It would be far better for governments to recognize that even these relatively vast amounts of money are mere drops in the bucket when compared to the funds being spent in ways that serve to deplete biodiversity. Biodiversity would be best served if all development expenditures gave full consideration to biodiversity concerns, and that biodiversity conservation elements were built into all relevant projects. Only through patient, long-term, and adaptive strategies is biodiversity likely to be conserved. A more cautious policy than is being taken by GEF should save money -- and give better value for that which is spent.

Joining efforts to preserve biodiversity

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INTRODUCTION

Our planet is poised on the edge of an unprecedented biological disaster (Wilson 1989). According to Norman Myers (1985), over one million species of animals and plants may become extinct in the next two decades alone. Myers based this figure on the conservative estimate that 5 million species of animals and plants live on earth and relating deforestation and habitat destruction to species diversity. We know now from Terry Erwin's estimates that up to 30 million species may inhabit our world (May 1988). If one-fifth of the world's biodiversity is destroyed, up to 5 million species may be lost in less than 20 years. This mass extinction is primarily due to human activities: modification and destruction of natural habitats, overexploitation, introduction of exotic species, pollution of ecosystems (Ehrlich and Ehrlich 1981) and climatic changes associated with global warming (Peters 1990).

If these dire predictions come true, they will undoubtedly have many unforeseeable consequences for natural ecosystems and for many aspects of our culture and economy. The value of conserving biodiversity has been discussed by many in search of arguments to protect our living planet and conserve the indispensable life sustaining ecosystems. Among others, Myers (1978, 1979) and Oldfield (1984) have eloquently demonstrated the close link between economy and environment in showing that plants and animals are at the origin of countless commercial products: medicines, oils, resins, food, drinks, building material, colorings, natural fibres, biological fertilizers or insecticides. The list of such products grows longer each day. The recreational value of wildlife is enhanced by the fact that in Canada some 91.3 percent of the population participated in an activity related more or less directly to wildlife in 1987 and that such activities resulted in expenditures totalling some $ 5.1 billion (Environment Canada 1989). Living species also have immense scientific value. Wildlife studies help us understand our own place in the universe, as well as the inner workings of our minds and our bodies. A certain number of species, such as emblematic plants and animals, have played and continue to play a significant role in the cultural life of peoples. The intrinsic uniqueness and beauty of each living thing should also prompt us to conserve all forms of life (Callicott 1986). In that vein, Edward Wilson (1984) even suggested that conserving biodiversity was the natural outcome of humanity, the expression of biophilia, the affinity of human beings for all

living things.

But the destruction of living species may hinder the functioning of ecosystems, thereby putting to jeopardy what Paul Ehrlich calls a "whole series of little recognized but absolutely essential services without which civilization cannot exist- indeed, without which *Homo sapiens* cannot exist" (Ehrlich 1985, p.160). Indeed biologically diverse ecosystems perform vital ecological services such as decomposition of wastes, purification of air and water, and cycling of nutrients (Salwasser 1990).

The preservation of biodiversity seems to be an overwhelming challenge, and success will only be possible through the concerted efforts of numerous individuals and organizations. In 1980, this task was defined as one of the three major goals of the World Conservation Strategy (IUCN-UNEP-WWF 1980). Ten years later, a growing number of countries are calling for an international convention to conserve biological diversity (Westman 1990). In North America, the responsibility for conservation ultimately lies with government agencies. However, non-governmental organizations (NGOs) are playing an ever-expanding and sophisticated supporting role.

FROM STATUS REPORTS TO RECOVERY PLANS

In Canada, the federal government's role in the conservation of biodiversity officially started in 1977, with the creation of the Committee on the Status of Endangered Wildlife in Canada or COSEWIC. COSEWIC was established by Environment Canada following a recommendation made in 1976 at a conference on endangered species co-sponsored by the Canadian Nature Federation and the World Wildlife Fund (Canada) with the objective of reviewing the status of Canadian species thought to be in danger. Its membership is now comprised of representatives from provincial and territorial wildlife agencies and delegates from a few other NGOs. As of 1990, COSEWIC has studied the status of 250 Canadian species, subspecies or populations and classified nearly 200 species of plants and vertebrates as vulnerable, threatened, endangered or extirpated. The contribution of NGOs to COSEWIC has ranged from financial support to scientific expertise, from political lobbying to public rallying. It is doubtful that our governmental agencies could have achieved even half of what has been done without the support of these groups.

Next to determining the status of various wildlife species, lies the immense task of recovering the most endangered ones. To this end, the Council of Canadian Wildlife Ministers established the Recovery of Nationally Endangered Wildlife (RENEW) program in 1988. This program ensures that federal, provincial, and territorial governments and the private sector are collaborating in establishing recovery programs that will remove species from threatened, endangered or extirpated status. For the first term of the committee, the private sector was represented by delegates of the Canadian Nature Federation, Canadian Wildlife Federation and World Wildlife Fund (Canada).

Among other responsibilities, the RENEW committee has to appoint recovery teams, approve recovery plans and establish the priority of recovery programs. Federal wildlife officials have recently agreed to include NGO representatives on endangered species

recovery teams. This will help ensure that people active in conservation at the local level are fully integrated into national recovery efforts. The ambitious schedule for action adopted by the RENEW committee should result in the development of recovery plans for each of the 25 terrestrial vertebrate species designated by COSEWIC as extirpated, endangered, or threatened, by the fall of 1991.

The Peregrine Falcon (*Falco peregrinus*) is one of those success stories made possible by the collaborative efforts of various contributors. In Quebec, the peregrine's recovery plan has benefited so far from the collaboration of the provincial and federal wildlife and parks agencies, a raptor research center (the Macdonald College Raptor Research Center of Montreal), a raptor rehabilitation society (Union québécoise pour la réhabilitation des oiseaux de proie), a private foundation (Fondation pour la sauvegarde des espèces menacées), a citizens' committee (from Saint-André de Kamouraska), a college (CEGEP de La Pocatière), an ornithologists club (Club des ornithologues du Bas Saint-Laurent), and a good number of dedicated ornithologists. The joint efforts of all these groups have led to the recent downlisting of the peregrine falcon from the endangered to the vulnerable category for the province, following the reporting of at least ten nesting pairs in southern Quebec (Robert 1989).

Naturalists in Atlantic Canada had started their efforts to protect the endangered piping plover (*Charadrius melodus*) long before the official recovery plan was made available in 1990. The Natural History Society of Prince Edward Island has done excellent work with PEI National Park to protect piping plover beaches. In conjunction with the Atlantic Centre for the Environment, they have produced and distributed educational posters, and a slide show on the species has been prepared and placed on videocassette. In the Magdalen Islands, two NGOs (the Mouvement pour la valorisation du patrimoine naturel des Iles-de-la-Madeleine and the Quebec Association of Ornithologists' Groups) and the Canadian Wildlife Service (Québec branch) have established a coordinated research and public education program on the species. Without these joint efforts, the piping plover national recovery plan would not be so advanced. Other volunteer organizations across the country are doing comparable work on species of particular concern to them, often in the absence of recovery plans or formal government support.

In the United States and Great Britain, organizations like Wildlife Conservation International, Conservation International, Jersey Wildlife Preservation Trust and World Wildlife Fund raise money for conservation projects and conduct scientific studies in support of conservation worldwide. The numerous NGOs acting for conservation constitute what British conservationist Lee Durrell calls "Noah's army" (Burnett et al. 1989).

ZOOS, ACTORS FOR CONSERVATION

Zoos and aquariums also have a tremendous potential to contribute to regional and global conservation efforts. With over 100 million visitors a year, such institutions (there are close to 200 institutional zoos and aquariums in North America alone) are becoming an important focus of public education (Hatley 1980, Serrell 1982). Nearly 90 percent of

zoos in the U.S. and Canada have an education department, and nature conservation has been the main focus of their programs for the past ten years.

In addition, professionally managed institutions provide a haven for some endangered species, thus increasing their chances for continued survival (Prescott 1985, Soulé et al. 1986). Through innovative research, zoos have developed successful techniques to manage and breed rare animals in captivity and contributed to the recent development of the field of small population biology (see Foose 1983 and Ralls and Ballou 1986).

In 1981, the American Association of Zoological Parks and Aquariums (AAZPA) established the Species Survival Plan (SSP), an ambitious scheme for the long term survival of endangered species through captive propagation (Wemmer et al. 1988). This goal is achieved through the coordination and strengthening of captive breeding programs. Five objectives characterize SSP programs:

1. re-inforcement of wild populations in danger of extinction,
2. providing a source of animals for re-population of original habitats if and when feasible,
3. serving as refuges for species that are currently extinct in the wild,
4. serving as repositories for germ plasm, i.e., semen, ova, and embryos,
5. providing the means to conduct research for the improvement of captive husbandry and management of wild populations.

In the interest of these goals, a masterplan is developed for each species in the program which generates institution by institution and animal by animal recommendations. Each SSP is directed by a Species Coordinator and a Propagation Committee selected from institutional participants. The entire program is managed by a small team employed by the AAZPA. Similar programs have been modeled after the SSP in other regions namely Europe, Australia, and Japan. These efforts have recently expanded worldwide through the efforts of the IUCN's Captive Breeding Specialist Group (IUCN, CBSG) which in itself is part of IUCN's Species Survival Commission (SSC). In November 1990, AAZPA and IUCN CBSG signed a memorandum of understanding to facilitate communication and participation across organizational lines and to foster cooperation in the use of captive propagation, to assist in prevention of species extinctions, and promotion of species conservation in natural habitats.

In Canada, the association between the Canadian Wildlife Service and zoos has led to the successful reintroductions of captive-bred Wood Bison (*Bison bison athabascae*) and Swift Fox (*Vulpes velox*). In the United States, cooperative programs between the U.S. Fish and Wildlife Service and zoos have also proved successful. Captive-bred Red Wolves (*Canis rufus*) have been successfully returned to the wild and Black-footed Ferrets (*Mustela nigripes*) and California Condors (*Gymnogypa californianus*) may soon follow.

Of the 56 SSPs currently in existence, only six are focused on North American endemic fauna (Black-footed Ferret, California Condor, Thick-billed Parrot, *Rynchopsitta p.*

pachyrhyncha, red wolf, Puerto Rican Crested Toad, *Peltophryne lemur*, and Virgin Island Boa, *Epicrates monensis*). Thus, with increased cooperation and funding, the potential for expansion is tremendous.

CONCLUSION

"The effectiveness of cooperation in attaining conservation goals has been demonstrated by The Nature Conservancy since its inception in 1951 (Jenkins, 1984). More recently, the value of cooperation was recognized in the first recommendation of the Terrestrial Animal Species Panel at the U.S. Strategy Conference on Biological Diversity (U.S. Dept. of State, 1982) (Salwasser et al. 1987, p.159). Salwasser (1990) and Falk (1990) have further demonstrated the role of interagency cooperation and integrated strategies in managing for viable populations of plants and animals. Salwasser et al. (1987) suggested the establishment of conservation networks in order to protect and manage the large natural areas needed to sustain key species as well as the integrity of entire ecological systems. We believe that this concept should be applied to species recovery plans.

Recovery teams should identify and integrate in their recovery plans NGOs and institutions such as zoos, aquariums, botanical gardens, conservation organizations, science museums, interpretation centres, colleges and universities, that could help them fulfil their mandate at the local level. The financial, scientific and/or technical contribution of private corporations should also be considered. Government authorities that oversee conservation efforts should formally recognize the contribution of NGOs and private or public institutions to recovery plans by signing memoranda of agreement. These memoranda of agreement are typically signed by top-level organization heads, outline the responsibilities of participating organizations and thus help to avoid any misunderstanding. Such agreement would not only help to ensure long-lasting cooperation between organizations (Salwasser et al. 1987) but could also foster the contribution of other, previously unknown, partners to the immense task of conserving biodiversity.

However promising Recovery Plans and SSPs may look for the protection of endangered species, these tools have many limitations in being only part of the solution. Indeed, the numbers of threatened species are increasing so rapidly that we may eventually need to create a new recovery team and program each day if not each hour. Alternatively, we need to formulate a global conservation strategy, the goals and objectives of which would be shared by all. Implementation of such a plan would certainly be dependent on finding sufficient funds. However we believe that cooperation and sharing are the fundamental keys to success.

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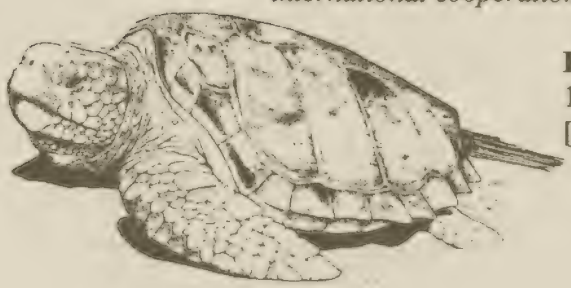
A timeless pledge: Declaration of Hiwasa

The sea turtles are large marine animals which today celebrate the same life with us on this earth. However, at present all species of sea turtles are definitely declining in numbers in the world's seas because of excessive interference by man. The sea turtles, which are the common property of mankind, must not be allowed to be driven to extinction by our generation. The sea turtles do not recognize national or local government boundaries. With the vast oceans as their home and making large-scale migrations, it is useless to attempt to conserve the sea turtles within the narrow boundaries of prefectures and cities, as we have learned at this conference from many examples around the world. Consequently, today it is strongly desired that there will be a broad view of conservation surpassing the bounds of localized protection for the sea turtles which [live] in our country. In particular, the Loggerhead Turtle should be protected as a designated natural monument. We, as inhabitants of the Earth, hereby declare our feeling that safeguarding of the land and marine environments and strong international cooperation are more than ever needed for the conservation of sea turtles.



Hiroshi Kida, Mayor of Hiwasa Village, 1 August 1988
1988 Hiwasa International Turtle Conference in Japan.
[Marine Turtle Newsletter, Number 51, October 1990].

CITES bans Thailand endangered species trade

The Standing Committee of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), acting on a proposal from the Secretariat has decided to recommend to the 110 Member States of this treaty to prohibit any trade in fauna and flora species covered by CITES with Thailand. This ban should enter into force immediately.

For a number of years, Thailand has been an important focus of illegal trade in animals and plants, mainly monkeys, live birds, reptile skins and plants.

Although a member of CITES, Thailand has still not passed national legislation allowing it to implement the Convention; it ignores the Secretariat's requests for information and does not submit any annual report as to the quantity of imported, exported or re-exported CITES specimens.

Thailand is a revolving door for illegal trade and its attitude compromises the efforts of other states towards protecting their wild fauna and flora.

The CITES Secretariat, before providing the Standing Committee with a report showing close to a hundred infractions of the Convention since 1988, had made all efforts possible to improve the situation, but without any great results.

Jacques Berney, Acting Secretary General, says "We regret we have to reach such extremes, however there is no other solution and we hope that this will convince the Thai authorities of the imperative necessity for drastic measures."

The Standing Committee also examined a report on illegal trade from Grenada and has decided to grant the Government of this country three months to improve the situation as it committed itself to do failing which a prohibition similar to that recommended for Thailand, will be recommended to CITES Parties.

Lausanne, 12 April 1991

For further information, please contact:
J.P. Le Duc, Infraction Prevention and Information Officer
CITES Secretariat 6, rue du Maupas, CH-1000 LAUSANNE 9, Switzerland
Telephone: (41) 21 20 00 81

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Adages, old and new

A celui qui me dit
Je suis de tel pays...
Je réponds: De quel arbre?
Et de quelle fontaine?
Gilles Vigneault

The first law of intelligent tinkering is to save all the parts.
Aldo Leopold

...the loss of genetic and species diversity by the destruction of natural habitats..
is the folly our descendents are least likely to forgive us." Dr. E.O. Wilson

The town is saved, not more by the righteous men in it than by the woods and swamps that surround it. Henry David Thoreau

The Canadian Biodiversity Databank

Erich Haber, Botany and
Don E. McAllister, Ichthyology
Canadian Museum of Nature
P.O. Box 3443, Station D
Ottawa, Ontario K1P 6P4, Canada

*The **Canadian Biodiversity Databank** uses two Digital MicroVax 3800s, each with 16 MB of RAM and has 2.4 gigabytes of disk space.*

Biodiversity - A Measure of Species Richness

Biodiversity is a term that describes the relative richness or variety of living organisms - plants, animals, fungi and microbes that live in a given place, country or our planet. It is most commonly evaluated through measures of species diversity. The greater the numbers of species found in an area the greater the biodiversity. Measures of genetic diversity, the degree of variation in the genes carrying the hereditary information, and ecosystem diversity, the variety of major natural habitats such as coniferous forests, prairies, deserts or wetlands in a region are also used to define biodiversity.

Digital 600 LPM Lineprinter and Steve McAllister

In spite of man's technological achievements, only a portion of the worldwide species diversity is scientifically documented. Even in Canada, conservative estimates suggest that half of the animals, plants and micro-organisms are either unrecorded or not yet scientifically named. In general, the ratio of unknown organisms is higher in little-studied groups as bacteria or in ecosystems such as soils, rain forests and tropical reefs.

Importance of Biodiversity

The interdependence of all living organisms forms an intricate web of life that is the fabric of the ecosphere. Plants, as primary producers, capture solar energy, absorb carbon dioxide, give off oxygen and provide food, shelter and numerous useful byproducts used by other organisms. Predatory animals, parasites and disease organisms control population numbers, and micro-organisms and scavengers recycle waste materials and dead organisms providing nutrients for primary producers. The ecosphere depends on hundreds of thousands of species to sustain these life-giving cycles.

Gandalf Starmaster Communications system

Safeguarding biodiversity is important to humans not only because it maintains the ecosphere of which we are a part, but because we are totally dependent on all other forms of life for our source of food, fuel, medicines, raw materials, recreation, and for cultural, educational and scientific pursuits. Human life depends intimately on the health of the ecosphere and its biodiversity.

Vanishing Biodiversity

Natural and domestic varieties, subspecies, even genera and families of organisms are disappearing from the planet. Extinct species cannot be replaced. Ecosystems such as coral reefs, tropical rainforests, and

remnant Canadian prairies are threatened. Unseen but critical micro-organisms are threatened by chemical fertilizers, pesticides, acid rain and loss of organic nutrients. Increased Ultraviolet radiation is affecting Antarctic marine phytoplankton; expanding human populations threaten environments around the world.

Biodiversity Collections and their Importance

The Canadian Museum of Nature has, as part of its mandate, the responsibility to establish, maintain and develop for research and posterity a collection of natural history specimens. The museum's collections had their origin in the specimens of minerals, fossils, birds, mammals and plants collected by geologists exploring Canada's unknown hinterland almost 150 years ago. From these early collections grew an array of carefully collected, preserved and documented specimens, today numbering over 6 million. Represented in the collections are such diverse groups as dinosaurs, leeches, insects, snails, frogs, fishes, birds, mammals, algae, lichens, mosses, flowering plants and gems.

These scientific collections, and those in other Canadian natural history museums and institutions, are the nation's prime source of information on its flora and fauna. They document the presence of species in time and space, their ecological preferences, give insights into past climates and ecosystems and provide material for systematic research. The collections permit the publication of identification manuals, monographs, keys and authoritative distribution maps. The Canadian Museum of Nature has the largest most diverse natural history collections and the largest library of taxonomic literature in the country.

The BIODIV Databank

In order to provide speedy access to specimen data in its vast holdings, the Canadian Museum of Nature has pioneered the computerization of its collections and computer mapping of collection data. The degree of computerization varies. About 95 % of the catalogued fish collection is computerized but only 5 % of its over .9 million botanical collections. Yet in spite of the low percentage for plants, this still represents the largest computerized botanical databank in Canada. Overall, about one sixth of the museum's specimens are computerized and comprise over 200 megabytes of collection data. Catalogued collections yet to be entered probably total a gigabyte. The data bank, installed on two Alpha Micro minicomputers, is being transferred to a new VAX system with new relational database software.

Uses of the BIODIV Databank

The advanced state of computerization of some collections, such as those for fish and the rare vascular plants of Ontario, makes possible routine data search for information requested by a wide range of clients, including: Department of the Environment, Fisheries and Oceans, Ontario Ministry of Natural Resources, Committee on the Status of Endangered Wildlife in Canada, conservation organizations like World Wildlife Fund, the Nature Conservancy, universities and private consulting firms.

The BIODIV Databank is a source of information that can be used for a variety of purposes:

- Where are Canada's "hotspots" of plant biodiversity?
- Are there any records of the endangered Kirtland's Warbler for Ontario?
- Do any endangered species occur at the proposed site of a new dam?
- Do we have a series of walleye from the Ottawa River from 1940 to 1990 that can be analyzed for mercury or aluminum contamination?
- What does biodiversity data in the mollusc, fish and marine algae collection suggest concerning the location of marine parks?
- Plot a distribution map of records, by decade, of the introduced Helleborine orchid in Canada.

Completion of the BIODIV Databank

The Canadian Museum of Nature will continue with its computerization of specimen data and on-going development of its databank to maintain its role as one of the major sources of biodiversity data in Canada. To address the urgent need for information on critical species and habitats, new resources will be required for additional term employees for specimen identification, cataloguing, and data input and verification. The BIODIV Databank complements environmental work being carried out in DOE, DFO, AC and other organizations, and serves as one of the most valuable environmental resources in Canada.

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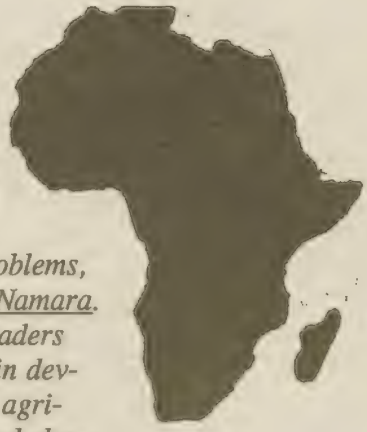
A blueprint for Africa



From IPPF People Features

There is no easy or quick solution to Africa's problems, says former World Bank President Robert S. McNamara. But solutions are possible, he says, if Africa's leaders and the international community play their part in developing long-term policies and plans to increase agricultural production, conserve the environment and slow population growth.

Sub-Saharan Africa poses the greatest development challenge facing the planet today. To register even a modest improvement in the quality of life, the Sub-Saharan economies must raise their rate of economic growth from less than 1 per cent per annum - the level of the 1980's - to at least 4-5 per cent a year.

Expansion of agricultural output should be the foundation of growth over the next decade. But that will require the relationship between agricultural stagnation, explosive population growth, and degradation of Africa's resource base to receive far more emphasis than in the past.

Although the majority of the people of Sub-Saharan Africa are dependent on the land for their living, the land's capacity to produce is ebbing away under the pressure of rapidly growing numbers of people who do not have the wherewithal to put back into the land what they are forced to take from it.

As the land's vegetative cover - trees, shrubs, grasses - shrinks, its already fragile soils lose the capacity to nourish crops and retain moisture. Agricultural yields fall and the land becomes steadily more vulnerable to the naturally variable rainfall, turning dry spells

into droughts and food shortages into famines.

Over the last 25 years, agricultural production in Africa rose by only around 2 per cent a year, less than population growth, so per capita food production has declined. Despite increasing food imports and food aid, about 100 million Africans are malnourished. The failure of African agriculture has also choked off the continent's earning potential: agricultural exports have declined sharply - by more than 3 per cent a year - since 1970.

Meanwhile Africa's population is growing - exponentially. Fertility rates in Sub-Saharan Africa remain at very high levels; at current rates the region's population will reach 1.6 billion by 2020. No region has ever managed to develop satisfactorily with this rate of population growth. Yet, many Africans remain to be persuaded of the imperative of smaller families.

Only a combination of a reduction in population growth, improved agricultural performance and better environmental management can change matters. Africa must set its overall target for long-term agricultural growth at about 4 percent for both food and export crops - twice the rate achieved in the 1980's.

Fig. 1. The world population clock at Canada's International Development Research Centre showed (upper register) a world population of 5.32 billion people on May 29, 1991. The clock was ticking over at a rate of 155 additional persons a minute, 81 million persons a year - the equivalent of a new country. The lower register of the clock shows the shrinking amount of available arable land.

To achieve this ambitious but not impossible target, all African countries will need to allow prices to move flexibly in response to changing market conditions; to turn over the supply of inputs, marketing, processing, and exporting largely to individual entrepreneurs and reduce administrative controls; to promote credit at realistic interest rates through

home-grown financial institutions (as already exist, for example, in Cameroon and Rwanda); to reform gradually systems of land tenure to increase security of ownership and stimulate investment in land improvements; and to upgrade rural roads through local efforts.

There is evidence that the African farmer, as farmers elsewhere, will respond to such incentives. In recent years, increased production of maize in Zimbabwe, coffee in Guinea, cotton in Benin and Tanzania, cocoa in Ghana, and groundnuts in Gambia can be attributed in large part to policy and, especially, price reform.

Slowing population growth is the second imperative. A minimum target would be for Africa to realize the rates of fertility decline (a 50 per cent reduction in three decades) already achieved by other developing countries. Even under this scenario, the Sub-Saharan population would be over 1.2 billion by 2020 and would not level off below 3 billion. Moreover, the target is highly ambitious in the African context.

Most African governments now officially endorse child spacing and family planning. But there is an urgent need to match expressions of general commitment with specific technical, financial and political support. There is strong evidence that when family planning services - which today are woefully weak - are made widely available, and especially when backed by mass media campaigns and community-based education, contraceptive use becomes high.

Zimbabwe, for example, has been developing family planning services since its Independence. As a result, the contraceptive prevalence rate has risen from 5 per cent in the late 1960s to an estimated 43 per cent in 1988. The total fertility rate has dropped from over 7 to 5.3 over the past 10 years. In stark contrast, in most African countries only an estimated 11 per cent of couples use contraceptive methods (whether modern or traditional).

To reach the fertility target by 2025, nearly half of African couples would need to be using effective contraception. This will require an intensive effort by African countries and greater, more enlightened, support from the international community.

Family planning aid would need to be increased to $650 million a year by the turn of the century. As for the costs to individual countries, based on recent experience in Zimbabwe and Botswana, annual allocations of no more than 0.6 to 0.8 per cent of GNP would allow countries to put in place substantial family planning programmes. Not only are these costs modest, they would be more than offset by the savings in education and health budgets and food imports that lower fertility would bring

A specific and extensive environmental programme will also be required. This must combine productivity and protection and help African farmers to make the right decisions in their own self-interest. For, ultimately, planting the trees and protecting the vegetation, terracing the fields, and applying mulch to worn-out soils will have to be done by Africa's farmers - and they will make that effort only when they are given the

right prices for using environmentally sustainable crops and technologies.

Each country will need an environmental action plan - backed with sufficient staff, institutional and financial resources, and political support. It would set targets and design the criteria for specific environmental actions. Donors currently provide about $500 million a year to Africa for environmental activities. This is totally inadequate. In Madagascar alone, the World Bank has put the cost of continued environmental degradation at between $180-300 million a year.

In the past five years or so, there has been one great sea of change for the better: African governments and institutions are coming to the realization that the primary responsibility for Africa's future rests in its own hands. But Africa also needs sustained and increased external support - including debt relief mechanisms - if it is to overcome its development crisis.

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Illustrating biodiversity?

The *Canadian GNSI Newsletter* serves Canadian members of the **Guild of Natural Science Illustrators.** If you need biological illustrations drawn, you can contact the **GNSI-Canada** co-ordinator, Lisette Mallet, 91 Spencer Avenue, Suite 211, Toronto, Ontario M6K 2K5, Canada, or phone at (416) 534-1079. Or you can apply to Lisette if you are a natural science illustrator or would like to become a member of **GNSI-Canada**.

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Biodiversity facts

Ants have colonies in every country in the world and represent one-third of the combined weight of all animals. By one estimate there may be one quadrillion (10^{15}) individual ants living on the earth. That is 200,000 ants for every human.

E.O. Wilson (1991, **Equinox** magazine).

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The **bacterium**, *Bacillus thuringiensis* (Bt), is being used for aerial spraying of the gypsy moth by the Ontario Ministry of Natural Resources. The gypsy moth, introduced into the United States, has spread north into southern Canada where its caterpillar has been consuming the leaves of trees and other plants. The

Ministry chose to use Bt instead of an insecticide to moderate populations of the moth. The advantage of a biological control over an insecticide is that the biological control may evolve along with its host and retain its power to regulate populations. Typically, insects and other pests exposed to pesticides (such as an insecticide) evolve resistance to the insecticide, rendering it ineffective.

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Biodiversity Meetings

■ April 14-21, 1991. **2nd International Symposium on Integrated Global Ocean Monitoring**, sponsored by UNEP, WMO, UNESCO'S IOC, IAEA, the USSR's State Committee for Hydrometeorology and Academy of Sciences, at Leningrad, U.S.S.R. Contact:

Organizing Committee
Symposium on Integrated Global Ocean Monitoring
National Environment and Climate Monitoring Laboratory
20-b, Glebovskaya
107258 Moscow, U.S.S.R.

■ April 22-23, 1991. **Caribbean Preparatory Meeting for World Parks Congress**, held at Santa Domingo. Contact:

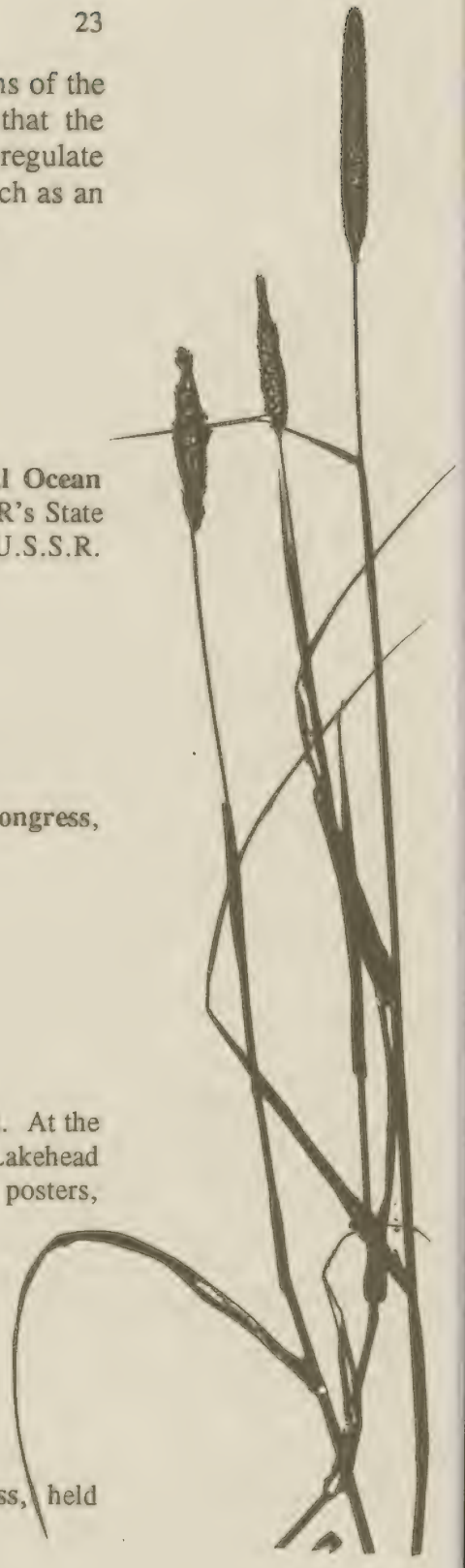
Caribbean Natural Resources Institute
1104 Strand Street, Suite 206
Christiansted, St. Croix
U.S. Virgin Islands
U.S.A. 00820
Telephone: (809) 773-9854; fax: (809) 773-5770.

■ May 8-11, 1991. Feature symposium: **Climate change and the boreal forest**. At the 30th Annual Conference of the **Canadian Society of Zoologists** to be held at Lakehead University, Thunder Bay, Ontario, with lectures, symposia, contributed papers, posters, and student competitions. For more information write:

Canadian Society of Zoologists 30th Annual Conference
c/o Mrs. Diana Abraham
Department of Zoology
Lakehead University, 955 Oliver Road
Thunder Bay, Ontario P7B 5B1, Canada
Fax: (807) 343-8023.

■ May 20-23, 1991. **Society for Ecological Restoration, 3rd Annual Congress**, held at Orlando, Florida. Contact:

Society for Ecological Restoration
1207 Seminole Highway



Madison, Wisconsin, U.S.A. 53711.

■ May 27-31, 1991. **24th International Symposium on Remote Sensing of the Environment**, held at Rio de Janeiro. Contact:

International Symposia Organizer
Environmental Research Institute of Michigan
P.O. Box 8618, Ann Arbor, Michigan
U.S.A. 48107-8618
Telephone: (313) 994-1200, ext. 2290/3886; Fax: (313) 665-6559.

■ May 27 - 2 June, 1991. **Pacific Science Congress**, held at Honolulu, Hawaii. Contact:

XVII Pacific Science Congress Secretariat
2424 Maile Way, 4th floor
Honolulu, Hawaii, U.S.A. 96822

■ June 7-9, 1991. **Planet Earth: Perspectives and prospects.** Held at Queen's University, Kingston, by Queen's University, Learned Societies, and the Canadian Federation of Biological Societies. Contact:

Principal
Queen's University
Kingston, Ontario K7L 3N6, Canada

■ June 15-20, 1991. **Symposium on Conservation of Biodiversity of Fishes, Amphibians, and Reptiles**. Sponsored by the **American Society of Ichthyologists and Herpetologists** at their annual meeting in New York city. Already 59 papers on fauna of North and South America and Asia were to be presented. For more information contact:

James D. Williams
USFWS, National Fisheries Research Center
7920 N.W. 71st Street
Gainesville, Florida, U.S.A. 32606
Telephone: (904) 378-8181; Fax (904) 378-4956.

■ June 17-21, 1991. **Human Tropical Lowlands Conference, development strategies and natural resources management.** Held at Panama City, Panama and sponsored by Development Strategies for Fragile Lands (DESFIL). Contact:

DESFIL Conference
7250 Woodmont Avenue, Suite 200
Bethesda, Maryland, U.S.A. 20814

■ June 24-28, 1991. **Second negotiating session on the Biological Diversity Convention** to be held at Madrid, Spain. Contact:

UNEP
P.O. Box 30552
Nairobi, Kenya

Telephone: (254-2) 333930 or 520600; Fax: (254-2) 520711.

■ July 11, 1991. **An appraisal of taxonomy in the 1990's.** Held in London by the Systematics Association. The program will include sessions on plant diversity, animal diversity, paleontological systematics, taxonomy in bioarcheology, taxonomy and conservation, applied taxonomy in public health, river blindness in West Africa: the application of taxonomy to a disease control program, and the role of museums. Contact:

Dr. Z. Lawrence
International Mycological Institute
Ferry Lane, Kew, Surrey TW9 3AF, U.K.
Telephone: 081 940 4086

■ July 21-25, 1991. **International Association for Landscape Ecology (IALE).** To be held at Ottawa with six major symposia and contributed paper sessions planned. Contact:

Dr. G. Merriam, President IALE
Department of Biology
Carleton University
Ottawa, Ontario K1S 5B6, Canada
Telephone: (613) 788-3859; Fax: (613) 788-4497

■ August 19-23, 1991. **Maintaining biodiversity, should you be concerned?** Sponsored by Forestry Canada and the Ontario Ministry of Natural Resources. To be held at the Delta Inn, 361 Queen Street, Ottawa, Ontario, Canada. For registration contact:

Steen Magnussen, Forestry Canada
Petawawa National Forestry Institute
Chalk River, Ontario K0J 1J0, Canada
Telephone: (613) 589-2880
Fax: (613) 589-2275

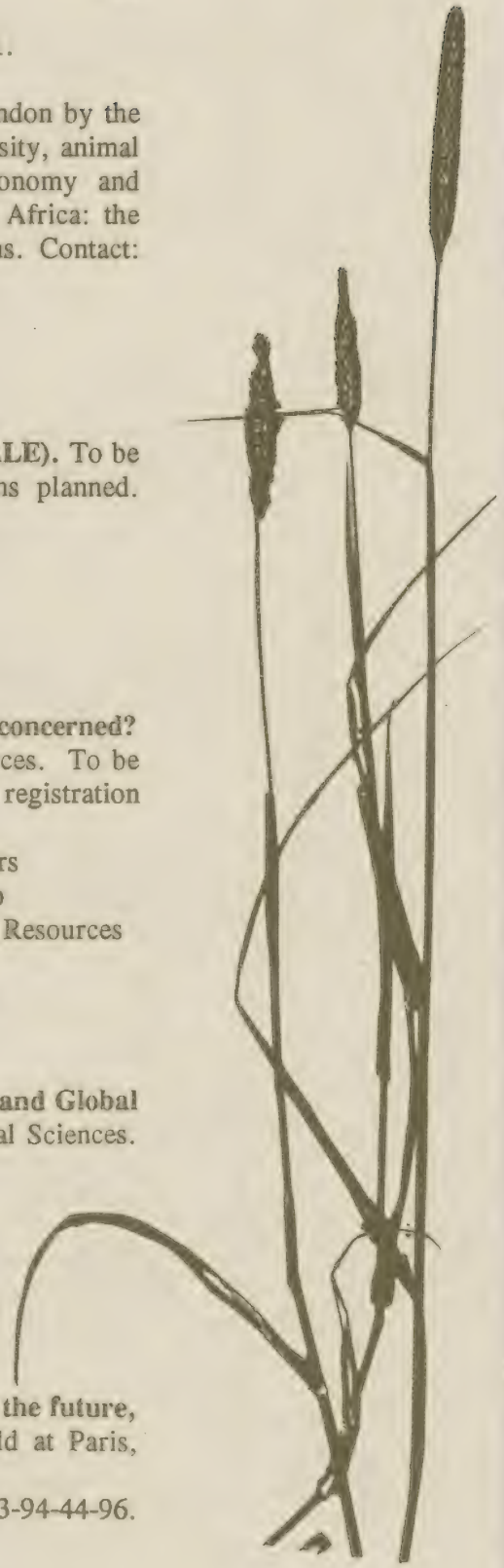
OR Cathy Nielsen/Ron Evers
Fast Growing Forests Group
Ontario Ministry of Natural Resources
Brockville, Ontario
Telephone: (613) 342-8524
Fax: (613) 342-7544

■ September 1-6, 1991. **Symposium on International Biological Diversity and Global Change.** Sponsored at Amsterdam, Netherlands by the Union of Biological Sciences. Contact:

Dr. H.M. van Emdem
IUBS 24th General Assembly
c/o Biologische Road KNAW
P.O. Box 19121, 1000 GC
Amsterdam, The Netherlands
Telephone: 31-20-222902.

■ September 17-27, 1991. **10th World Forestry Congress: A heritage for the future, United Nations Food and Agriculture Organization (FAO).** To be held at Paris, France. Contact:

Mme Gueguen
Telephone: (33-1) 43-94-43-00; Fax: (33-1) 43-94-44-96.



■ October 7-10, 1991. **Wildfor 91.** Wildlife and Forestry: Towards a working relationship. A National Forum: The forum is the first national attempt to bring together the major stakeholders in this field to talk constructively about ways to manage these natural resources. Arranged jointly by the Canadian Society of Environmental Biologists and the Canadian Pulp and Paper Association. Contact:

Wildfor Secretariat
Canadian Pulp and Paper Association
Woodlands Section, Sun Life Building, 19th Floor
1155 Metcalfe Street
Montréal, Québec H3B 4T6, Canada
Telephone: 514-866-6621; Fax: 514-866-3035

■ November 4-8, 1991. **Global Assembly of Women and the Environment - Partners in Life.** Held by UNEP and World WIDE Network in Miami, Florida. Contact:

Joan Martin Brown, UNEP
1889 F Street, NW, Washington, DC, U.S.A. 20006
Telephone: (202) 289-8456; Fax: (202) 289-4267.

■ December 9-14, 1991. **Tropical Mountain Ecosystem Function**. This symposium, originally announced for July 1991, will be global in scope, highlight biodiversity and global change in America and Africa, and will be held at Papayán, Columbia. Information from A.M. Cleef, Correspondent for the Netherlands.

■ January/February 1992. **African NGOs Environment Network: NGO Preparatory Symposium on "African Environment - Towards sustainable management.** Venue to be announced. Contact:

ANEN
Tom M'Boya Street
P.O. Box 72421
Nairobi, Kenya
Telephone: (254-2) 747 960 or 740 817.

■ June 1-12, 1992. ***The Earth Summit*, United Nations Conference on Environment and Development,** to be held in Rio de Janeiro, Brazil. The primary goal of the Summit will be to lay the foundation for a global partnership between developing and more industrialized countries, based on mutual need and common interests, to ensure the future of the planet. The Summit will be a conference of leaders of Government but its success will largely depend on the interest and support of peoples and their active participation in NGOs (non-governmental organizations) and citizens groups which will contribute to its preparations. Provision has been made for relevant NGOs to participate in meetings of the preparatory committee. A parallel event will be held by NGOs in Rio de Janeiro at the time of the Summit. Contact:

Secretariat,
United Nations Conference on Environment and Development (UNCED)
Case postale 80, Conches
Switzerland
Telephone: 41-22-789-1676; Fax: 41-22-789-3536

Exotic species introductions - Wildfire

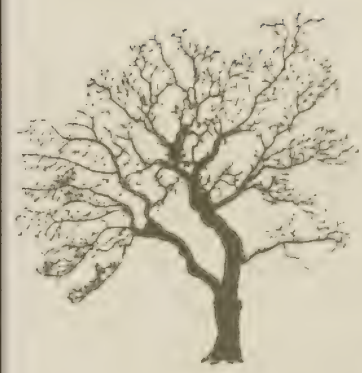
Introduced species sometimes spread like wildfire. Cases include purple loosestrife which arrived in New England as a ship's stowaway in the early 19th century; the zebra mussel which has spread across Europe from the Caspian Basin and is now invading eastern North America, clogging intake pipes and displacing native molluscs; the Nile perch which is impacting the speciose endemic flock of African cichlids in Lake Victoria; the rabbit in Australia, consuming herbage otherwise eaten by native wildlife and domestic sheep; and an introduced cichlid is spreading along the coast of a Polynesian island.

Species are introduced accidentally and sometimes intentionally. It is difficult to predict the course that an introduced species will run. Many introduced populations fizzle out, even with protracted efforts. In other species the introduced populations grow rapidly and spread steadily or rapidly; these have the potential to impact and displace native species or natural resources.

Intentional introductions in one state, province or country may subsequently spread to neighbouring jurisdictions. It would seem only ethical to consult with the neighbouring jurisdictions before such introductions are irrevocably made.

With the impacts so difficult to predict it is not reassuring to see efforts being made to introduce exotic species, especially when the introduction's potential impact has not been exhaustively studied. North Dakota fishery biologists are currently studying the possible introduction of the European zander, *Stizostedion lucioperca*, but will not introduce it "until North Dakota is assured that there will be no detrimental impacts and only then will they proceed with extreme caution." Introductions of zander in England have disrupted food chains by eating large numbers of small fish (*Oryx* 25: 67, 1991). Interested parties may write to: Terry Steinward, Chief of Fisheries, North Dakota Game and Fish Department, 100 North Bismark Expressway, Bismark, North Dakota, U.S.A. 58501-55095, or phone at (710) 221-6300. [From The AFS Diary, Volume 17, April 1991, p. 4].

Stizostedion lucioperca



Letters

Dear Editor:

First I want to complement you and all those that helped on the creation and publishing of *Canadian Biodiversity*. It is a timely and important contribution... Second I would like to subscribe and have enclosed a cheque.

Professor, Forestry Wildlife, University of British Columbia.

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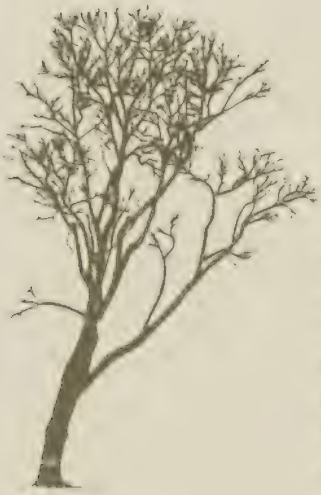


Biodiversity News Notes

Mexican Debt-For-Nature-Swap to Save Rain Forests

Mexico has just reached an agreement with **Conservation International** to spend $2.6 million worth of Mexican pesos on a broad set of environmental projects including conservation of the country's species-rich tropical rain forests. This will reduce the country's large foreign debt burden by $4 million. The debt-for-nature swap could prepare the way for much larger deals on a government-to-government level. According to Martin Goebel, Director of Conservation International, Mexico is a critical country in which to have achieved such a swap because it occupies such an important place globally in terms of its biological richness. Conservation International is authorized under the agreement to buy from Mexico's international creditors a total of $4 million in Mexican IOUs at discounted prices and will cost the group about 45¢ on the dollar, or $1.8 million. Conservation International will then forgive the full amount of the debt in return for Mexican government commitments to spend $2.6 million in pesos on the environmental projects.

Ten Old-growth Forests Safe From Logging in Ontario

On May 9th, 1991, Ontario Natural Resources Minister Bud Wildman unveiled a $10-million framework for sustainable forestry. The focus will shift from timber management to a more comprehensive policy including protection of old-growth forests, reducing dependence on chemical herbicides, involving the public in forest management decisions, tourism and fish- and-wildlife management. Ten old-growth forests including two in the Temagami area will be protected from logging until the completion of ecosystem studies. Aerial herbicide spraying will be reduced by 20% this spring. In a related development, criminal charges against members of a northern Ontario Indian band who blocked the Red Squirrel Road in the Temagami region have been withdrawn. A sustainable private woodlands strategy will also be developed. [Ottawa Citizen, 8 May 1991, p. A5].

British Columbia Conservation Data Centre
On January 8, 1991, British Columbia became the second Canadian province - after Québec - to establish a Conservation Data Centre. The program will collect and organize nearly a century's data on endangered species and natural communities, data which is now widely scattered throughout provincial institutions and elsewhere.

The program will be housed in the Wildlife Branch of the British Columbia Ministry of the Environment. The office will be located in Victoria.

The program is established by a contract between the Nature Conservancy (U.S.) and Nature Conservancy of Canada, the Nature Trusts of British Columbia, and the Ministry of the Environment. After three years, the provincial government will take the program over. L. Ron Erickson, Executive Director of the Trust notes, "B.C. has the greatest diversity of wildlife in Canada. Based on existing information we know that the province supports approximately 30,000 insect species, 2,500 species of flowering plants, 451 species of fishes, 39 amphibian and reptile species, 447 bird species, and 144 species of mammals. The CDC will be an invaluable tool in focusing our efforts to conserve this tremendously diverse natural resource." [**Biodiversity Network News** Vol. 4, No. 1, p. 6].

California Condors may return to the wild
In 1987 there were only 27 California Condors surviving. Now there are 40 of these condors thanks to the large number of eggs being raised in captivity. Next year one to three of the condors may be released back into the wild, in the mountains of Southern California.

G.E.F. - Environmental Fund for the Third World
Estimates suggest that developing countries need US$20-50 billion each year in the 1990s to cover the cost of environmental programs, including biodiversity. In September 1990, a joint statement was signed by UNEP, UNDP and the World Bank to seek financing of a 3-year US1.25 billion environmental fund, the Global Environmental Facility (G.E.F.). This will help provide funds for lesser developed countries from 1991 to 1993 with grants for investment, transfer of technology, technical assistance, research, and training. The focus would be on four priority areas:

* Guarding against depletion of the ozone layer;

* Climate change;

* Loss of biodiversity;

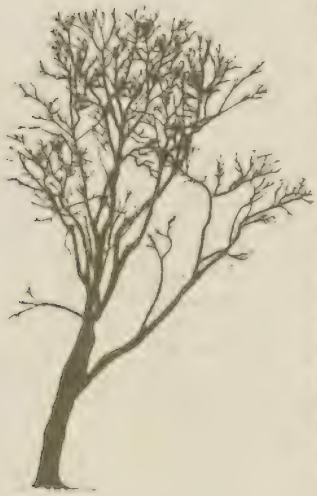
* Pollution of international waters.

For further information contact: Environment Department, World Bank, Room S-5029, 1818 H Street, N.W., Washington, D.C., U.S.A. 20433, or telephone (202) 458-0523. [From **CEPNEWS** 4(4), December 1990).

Last smallpox virus to be studied before intentional extinction

The smallpox disease was banished in humans more than a decade ago through vaccination campaigns. Stocks of the virus have been kept in deep freeze under tight security at the Centres for Disease Control (CDC) in Atlanta and at a Soviet research institute in Moscow. International health authorities have now decided to destroy the remaining stocks. "Eliminating the smallpox virus will finally enable us to say that this virus, which has caused so much human suffering over the centuries, has been totally destroyed," says Dr. Giorgio Torrigiani, director of communicable diseases for the World Health Organization (WHO) in Geneva. There have been no confirmed human cases since 1978. Destruction is due to be completed by the end of 1993.

Some health authorities are concerned about the irrevocability of intentionally extinguishing a living species. Donald Hopkins, a former assistant director of the CDC, who directed efforts to stamp out smallpox in 20 West African nations, stated, "It is presumptuous of us to think that somewhere, sometime, there will not be an important reason to study this virus again." In the coming year CDC and Soviets will map the entire genetic structure, 170,000 chemical subunits, of a strain that caused one of the world's last cases of smallpox, the "Bangladesh 1975."



New edition of The Flora of Nova Scotia

The Nova Scotian Museum is currently working with Dr. A.E. Roland on the third edition of *The flora of Nova Scotia*. Dr. Roland produced the first comprehensive flora of the province in 1944-45. A second edition by A.E. Roland and E.C. Smith appeared in 1969, and it is hoped that the third edition will be available within the next two years. New illustrations have been prepared by Dr. Roland for the work, which has been reorganized according to Cronquist. [**Flora of North America Newsletter** 5(1/2):7, January-April 1991].

Report on the Ontario Ecology and Ethology Colloqium

The **Ontario Ecology and Ethology Colloquium** held its annual meeting at the University of Guelph, Guelph, Ontario, Canada, May 12-14, 1991. The theme for the meeting was **Ecology of the 1990's**. Invited keynote speakers were Professor R.J. Berry, University College, London, England, the Past President of the British Ecological Society, who spoke on "An ecological synthesis", and Dr. H.R. Pulliam, University of Georgia, Athens, the President of the American Ecological Society, who spoke on "Ecology and the Sustainable Biosphere Initiative." Dr. Pulliam's talk was based on the initiative detailed in the publication of the Ecological Society of America, "The Sustainable Biosphere Initiative: An Ecological Research Agenda." (Ecology, April 1991, p. 371) (see also **Science** (1991) 252: 504). About 140 delegates attended the meeting, from universities and government agencies in Ontario, Québec, and neighbouring states and provinces. Contributed papers (73 in total) were given in sessions ranging from Behavioral Ecology, to Conservation Ecology, Ecological Variation, and Ecological Genetics. The 1992 meeting of OEEC will be hosted by Trent University, Peterborough, Ontario, Canada. Contact Dr. M. Berrell, Department of Biology, Trent University, for details. (This report courtesy of Dr. David L.G. Noakes, Director, Institute of Ichthyology, University of Guelph, Guelph, Ontario N1G 2W1,

Canada).

Burrowing owls re-established in B.C.
Burrowing owls have been re-introduced to a reserve near Osoyoos, south central B.C. Pairs of owls were brought in from the United States, provided with man-made burrows and short perching poles. The perching poles provide vantage points from which they can watch for prey. It has been found that young birds come back to the colony after winter, but not the adults. [Elizabeth Le Geyt, *Birds*, Ottawa Citizen, p. K2, 11 May 1991].

Nile crocodiles introduced to Brazil
A shipment of 110 Nile crocodiles were flown from Zimbabwe, Africa to a high-security compound in Porto Alegre, southern Brazil. The importer, a private company, plans to breed them and export their valuable skins. Environmentalists are concerned that some of the crocodiles will escape, reproduce and spread in the wild. Nile crocodiles, which grow up to 7 metres in length, may out-compete the 7 smaller species of caimans native to South America. Nile crocodiles kill dozens of humans in Africa each year, and may be expected to similarly attack people in Amazonia, if they spread into the wild. [Ottawa Citizen, 12 May 1991].

Don River Valley Task Force
Over the past century the Don River Valley in the Toronto area has been transformed from a wilderness space to an urban sewer and transportation corridor. This Lake Ontario tributary has been channelled, the marshes have been filled, and access to the valley has been blocked off. The **Task Force to Bring Back the Don** was formed by a growing group of concerned citizens and politicians brought together by the Toronto City Council. The Don Task Force hopes to restore the Don, using natural systems as much as possible by working and partnering with other organizations and government agencies. If you are interested contact: **Task Force to Bring Back the Don**, 20th Floor - East Tower, City Hall, Toronto, Ontario, M5H 2N2, Canada, Attention David Stonehouse. Call for information at (416) 392-0068.

Greenhouse Effect Warming?
Peter Wadhams (1990. Nature 345: 795-797) reported evidence for thinning of Arctic Ocean ice cover from north of Greenland. Ice profiling from submarine surveys carried out in 1976 and 1987 suggests a significant decrease in mean ice thickness. The thinning amounts to a loss of ice volume of at least 15% over an area of 300,000 km^2. Additional measures of ice pack thickness are needed to seek evidence for effects of climatic warming due to greenhouse warming.

Old Biodiversity Wars
A trade in Brazilian natural rubber began in the 1700s. By 1800, Belem was exporting 450,000 pairs of rubber shoes to England, depending on tapping by *seringueiros* of Amazon rubber trees that grew nowhere else in the world. During the First World War, rubber plantations were developed in Asia from plants smuggled out of the Amazon, causing a collapse in Brazil's rubber trade. [**NI**, May 1991, p. 21]. History such as this

will influence the debates going on in Madrid over drafting the UNEP Biodiversity Convention. Biotechnology is just a new angle to questions of exploitation, remuneration and equitable benefits of tropical biodiversity. Will benefits be shared, or will nature and local peoples be impoverished?

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Book and Periodical Niche

Rediscovery. Ancient pathways - new directions.
A guidebook to outdoor education.
By Thom Henley. 1989. Forewords by Bill Reid and David Suzuki. Western Canada Wilderness Committee, 20 Water Street, Vancouver, British Columbia V6B 1A4, Canada. Paper. 288 pages, illustrated. $18.95 Canada, U.S.$14.95. ISBN 0-9692230-3-X.

Clearly, the Earth is in trouble. Scientists such as Dr. David Suzuki have been telling us for years that man's alienation from the Earth which created him is leading us down a very perilous path. Only by overcoming such problems as acid rain, deforestation, and ozone depletion can man expect his future on the Earth to be a sustainable one (*It's a matter of survival*, Gordon and Suzuki, 1990).

Indigenous people around the world are in trouble. In Canada, native people occupy ten times more sites in the penal system than non-natives on a per capita basis. Evidence of cultural impacts abound: high rates of suicide amongst youth, alcoholism, drug abuse, and a lower life expectancy; all the symptoms of despair and rejection. The attitudes of governments and other citizens towards first peoples leave much to be desired - mercury-polluted rivers remain untreated, land claims remain unsettled, and aboriginal rights are ignored.

Rediscovery by Thom Henley describes a program of the same name that addresses these problems simultaneously. *Rediscovery* is a two-week camp designed specifically for natives that combines both outdoor pursuits and Environmental Education.

The first *Rediscovery* camp was launched in an enclave where much of what was strong and pround in an Indian culture still remains: in Haida Gwaii, known to non-natives as the Queen Charlotte Islands, home of the Haida people. From these beginnings the Rediscovery International Foundation has grown, and camps based on the Rediscovery model are now present in the following areas of the United States: southern Colorado; the Four Corners area of Utah; and in Canada: the Stikine, Bella Coola, Desolation Sound, Bella Bella, Cheanuh, Port Hardy, and Stein Valley areas of British Columbia; Athabasca Lake and Calgary areas of Alberta; and others.

The program encompasses a range of activities which Henley separates into three chapters: Chapter 1, The World Within, which focuses on the internal environment of each participant; Chapter 2, The Cultural Worlds Between, a fascinating chapter which describes various role-playing and other activities designed to erode barriers between participants of different races and cultures; and Chapter 3, The World Around Us, which focuses on Environmental Education programs that allow students to enhance their awareness of the wonderful world in which they live.

Chapter 2 describes the Rediscovery model. The following points are described to summarize the major tenets fo the program:

- **Homeland, heartland** - all of the activities of the Rediscovery program are linked to the land. The program includes a solo 24-hour vision-quest.

- **Living from the land** - unlike mainstream Environmental Education programs, hunting is used and encouraged, using principles of conservation. If an animal is shot, it is eaten in camp, and its hide may be made into a drum.

- **Extended family** - the programs have a family feeling to them, due to the presence of natives of all ages ranging from elders to the very young.

- **Elders** - elders are very effective in a camp setting, acting as counsellors and as story-tellers around the fire.

- **Cultural context** - "Every Rediscovery site reflects a distinct culture with its unique architecture and customs" (13).

- **Authenticity** - all Rediscovery camps have been based on native North American cultures, are locale-specific, and are organized by native communities.

- **Cross-cultural understanding** - both natives and non-natives attend the program. Many activities on Rediscovery are designed to stimulate cross-cultural sharing between natives and non-natives.

- **Flexible scheduling** - an emphasis is put on knowing when to let go of the schedule. Although the days have many activities scheduled, camps are run on 'Indian time.'

- **Sharing and speaking out** - an atmosphere of camaraderie encourages participants to express their feelings. Activities such as *Eagle Feather*, where an eagle feather is passed around a circle and only those holding it may talk, are an excellent way of encouraging expression.

- **Personal achievement** - many students feel the only recognition they receive from society is in the form of negative reinforcement. Rediscovery tries

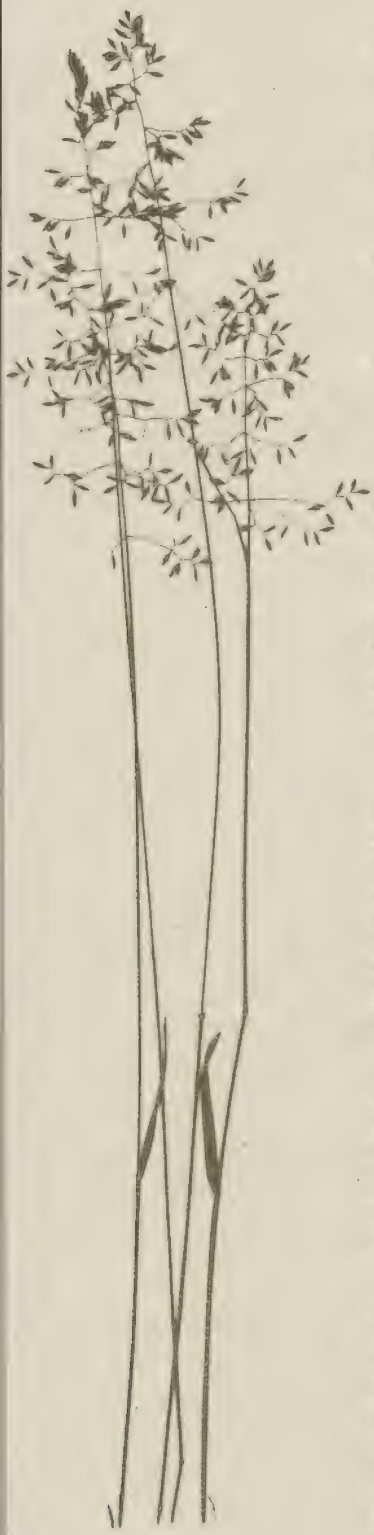
to change this; for example, participants in the solo vision-quests are honored in a special ceremony.

- **Healthy living** - all Rediscovery camps are drug- and alcohol-free, so students are exposed to an alternative life-style.

- **Leadership skills** - leadership skills are taught and participants are encouraged to return as Rediscovery guides the following summer.

- **Further education** - through Environmental Education, students receive an important extra dimension to their learning through direct field experience.

- **Follow-up** there is a movement underway to involve summer participants in activities throughout the year, to encourage the students to explore an outdoors life-style.



I think Henley does a magnificent job in portraying this program to its best advantage, and its goals are laudable. He sprinkles his text with quotes from Rediscovery participants and excellent color photos of activities; these help impart the flavor of the program. The Rediscovery goal of encouraging cross-cultural contact is to be applauded; knowing the summer camp environment as I do, I believe that there can be few more powerful unifying forces than the sort of immersion that Rediscovery participants go through.

As a humanist and educator I admire the activities that are described. For example, the *Eagle Feather* exercise is a valuable tool in encouraging self-expression and sharing. This is not an approach current in non-native culture. The emphasis on ecology is consistent with trends in Environmental Education; the activities excel at encouraging awareness and understanding. Emphasis on a third logical step in such education, that of **taking action**, is however neglected. I feel that this compromises the ability of participants to slow deterioration of the natural environment, and that "taking action" should be accorded more importance.

As a two-week program, *Rediscovery* occupies approximately 4% of a student's year; is this enough? Heartningly, a follow-up program is being piloted at many Rediscovery sites which may counter exposure of Rediscovery participants to many contrary influences. The approach might take participants out of their usual setting three or four times a year.

The Plains Indians Cultural Survival School (PICSS) has begun a *Rediscovery* program in Calgary, Canada. *Rediscovery* "is no longer a single program, but rather a broad network of affiliated programs, each community-founded and -based, independently administered and funded, and uniquely suited to its bioregion's indigenous culture... there are more differences than similarities between them" (19).

Environmental Education is necessary to save the Earth. The *Rediscovery* program can

help bring this about by helping survival of indigenous cultures that are close to the Earth and regard themselves as part of the family of life instead of lordly stewards as non-natives tend to believe, and by sharing the traditional attitudes and knowledge that would help us live in harmony with nature.

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Decapod Crustacea of the Atlantic Coast of Canada
By Hubert J. Squires. 1990. Canadian Bulletin of Fisheries and Aquatic Sciences (221): 1-532, 270 fig., 11 pl. Can$ 54.25 in Canada, $65.10 in other countries.

The fundamental aim of this book is to make identification of decapods, and decapod remains in predator stomachs, accessible to non-specialists. It is written for the use of fisheries scientists and others working on the ecology of vertebrates, on predator-prey relationships, and on ecosystem dynamics in the Atlantic region. It will be welcomed also by invertebrate taxonomists who, up to now, have had to use out of date, out of print, and out of country publications to identify decapods.

Decapod Crustacea basically comprises an Introduction, a series of Identification Keys, and Descriptions of individual species. The Introduction clearly outlines the coverage, and explains and illustrates the morphological characters used, as well as briefly touching on the Atlantic region and its fisheries. The Keys are exclusive to the region, and are clear and workable. Along with brief characterizations of families and genera, the 89 species are described and illustrated clearly and consistently, making for ease of comparison; there are also notes on distribution, with a regional map, and on biology. A species of shrimp from off Bonavista Bay, Newfoundland, Bythocaris spinipleura, is described as new to science, with types deposited in the Smithsonian.

The guide also contains a comprehensive Glossary, a list of References, and an index to scientific names. An intriguing Appendix gives the mythological derivation of some of the Latin names. Common names have been used only where, I assume, local names are available; unfortunately they do not all conform to the list established by the American Fisheries Society (1989. Special Publication 17) which we should be supporting to promote standardization of the names.

This is a well-prepared and well-produced guide to the decapods that I highly recommend. An added bonus is that it is printed on recycled paper.

Diana Laubitz, Zoology Division, Canadian Museum of Nature

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Proceedings of a workshop: Marine ecosystem studies in Hudson Strait./ Compte

rendu d'un atelier: Etudes de l'écosystème marin du détroit d'Hudson.
J.A. Percy (Editor). Canadian Technical Report of Fisheries and Aquatic Sciences / Rapport technique canadien des sciences halieutiques et aquatiques (1770): 1-175.

This report presents the results of a workshop on the marine ecosystem of Hudson Strait sponsored by the Québec region of Department of Fisheries and Oceans. The objectives of this workshop were to review the information presently available about the structure and functioning of the marine ecosystems, pinpoint significant gaps in our knowledge, and identify promising directions for future research. A number of important recommendations were made. Those bearing on biodiversity included: obtain additional baseline knowledge of the biodiversity, taxonomy and distribution of zooplankton in the region; obtain additional baseline knowledge about the biodiversity, taxonomy and distribution of benthic organisms in the Hudson Strait region; prepare a comprehensive book on the taxonomy and distribution of arctic fishes; complete the needed taxonomic revision of a number of Arctic fish groups such as Cottidae and Zoarcidae; carry out a base-line multi-gear grid survey of fishes of the Strait, preserve voucher specimens and environmental parameters, store data in a GIS system and specimens in the national museum, publish a distribution atlas; affirm the role of native people in managing biodiversity, ecosystems and marine resources. There is much valuable information and many more sage recommendations in this study.

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A survey of U.S.-based efforts to research and conserve biological diversity in developing countries.
By Janet N. Abramovitz. 1989. Center for International Development and Environment, World Resources Institute, Washington, D.C.

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Environments at risk: Case histories of impact assessment
By Derek Ellis. 1990. Springer-Verlag, New York. 329 pp. $39.50.

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A catalog of Nearctic Chironomidae
By D.R. Oliver, M.E. Dillon and P.S. Cranston. Agriculture Canada. Obtainable from: Canada Communications Group, Printing Bureau Building, 45 Sacre-Coeur Boulevard, Hull, Quebec K1A 0S9, Canada, Catalog No. A43-1857-1990. $18.50.

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World Plant Conservation Bibliography
By Threatened Plants Unit, World Conservation Monitoring Centre, Royal Botanic Gardens. Obtainable from: IUCN Publications Services Unit, 219c Huntingdon Road, Cambridge, CB3 0DL, U.K. Telephone: (44-223) 277-314; Fax: (44-223) 277-136.

The bibliography contains references to over 10,000 points of reference to published literature relevant to those engaged in plant conservation at international and national levels.

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Economics of protected areas - A new look at benefits and costs
By John A. Dixon and Paul B. Sherman. Island Press, Box 7, Covelo, California, U.S.A. 95428. Telephone: (800) 828-1302; Fax: (707) 983-6414.

Provides a methodology for assigning monetary values to nature within the rapidly changing field of economic evaluation of protected areas. Part I explains available economic techniques and how to apply them, and Part II applies them to case studies in Latin America, the Caribbean, Thailand and other nations in Africa and Asia.

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Essay: The grim payback of greed
By Alan Durning. International Wildlife, May-June 1981, p. 38-41.

This is a concise and all-too-brief excerpt, detailing overconsumption by people in the world's richest countries and how it is killing the Earth. This article puts into perspective the insatiable avarice of mankind. The shock is in the realization that the author is writing about **you** and **me**! And he gives very simplistic solutions, as did Aristotle, Lucretius, Tolstoy and others, obviously on deaf ears. Examples of consumption increase since the beginning of the century include: energy and wood use has doubled, car ownership and cement use has quadrupled; aluminum consumption has grown seven-fold and air travel has multiplied 32 times. In the U.S., air conditioning has grown from 15% of households in 1960 to 64% in 1987, and color television sets from 1 to 93%. Today's Japanese consume 5 times as much energy and 25 times as much steel than the Japanese of 1950. In the same time period West Europeans doubled intake of cement and tripled paper consumption. The American dream has included building 99% of the world's nuclear warheads and pumping out two-thirds of the planets greenhouse gases. The 1.25 billion people at the top of the ladder obtain about 40% of their calories from fat and eat three times as much fat as the remaining 4 billion persons, and, in so doing, consume nearly 40% of the world's grain that fattens the livestock they eat. "The avarice of mankind is insatiable," wrote Aristotle 23 centuries ago. Perhaps Henry David Thoreau had it right when he scribbled in a notebook beside Walden Pond, "A man is rich in proportion to the things he can afford to let alone."

Susan A. Jarzen

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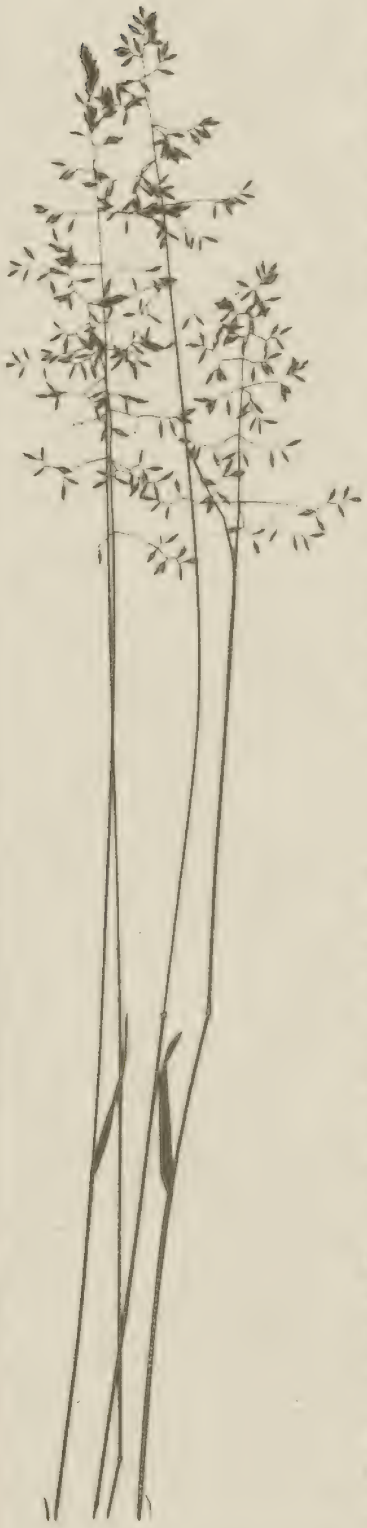
Status of threatened Mexican fishes
By Patricia C. Almada-Villela. 1990. Journal of Fish Biology Volume 37 (Supplement A): 197-199.



For its size and partial aridity, Mexico has a rich freshwater fish fauna of some 500 species. About 160 of these species are threatened. The numbers of threatened species are highest in the north, with for example, 62 species in the desert regions of Sonora and Chihuahua threatened. The low proportion of threatened species in southern Mexico may partly reflect the state of knowledge for those species. Eighteen species of freshwater fishes are reported to be extirpated or extinct in Mexico. This excellent report draws attention to the serious state condition of freshwater fish biodiversity in Mexico where water use is competed for by many sectors. Dr. Almada-Villela underlines that assessment of the status of marine and especially coral reef fishes needs to be undertaken. As in many other countries, the study of the status of marine fishes has been neglected. Dr. Almada-Villela is on both the Freshwater and the Coral Reef Fish Specialist Groups of the IUCN's Species Survival Commission.

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Diversity
A News Journal for the International Plant Genetic Resources Community, Volume 6, Numbers 3 & 4, 1990.

This quarterly journal is published by Genetic Resources Communications Systems, Inc., a non-profit corporation based in Washington, D.C., U.S.A. The journal is committed to serving the plant genetic resources community and has established itself both as a respected and authoritative national and international journal. [**Flora of North America Newsletter** 5(1/2):4, January-April 1991].

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Green Teacher
Published 5 times per year by **Green Teacher**, 95 Robert Street, Toronto, Ontario M5S 2K5, Canada. Subscription $27/year or $50/2 years, GST reg. #124 125 337. ISSN 0953-3028.
The **Green Teacher** is now an independent Canadian magazine. Founded in Wales in 1986, **Green Teacher** was a non-profit UK-based teacher's magazine focusing on global, environmental education. By 1990, over 1100 Canadian schools and teachers were subscribing. At that point, a group of Canadian educators decided to launch a separate Canadian edition. The new edition will continue to provide international perspectives about innovative green teaching.

Green Teacher aims to bring global education to the centre of the curriculum and to challenge old methods of teaching and developing programs that ensure our schools are environmentally friendly. It is a vehicle to share new perspectives and fresh ideas with other educators.

Issue 22, the first Canadian issue focused on native people's perspectives for Canadian education. It contained such articles as: *Going fishing! Science education in the N.W.T.; The next drummers: Native-run education;* and *Aboriginal Australia: An alphabet of*

activities. Other articles included *Creating our common future - A contest* and *School districts turn Green*. Issue 23 included such articles as: *Green empowerment; Ecology and the study of literature; Mathematics and garbage; L'Art: Un calendrier vert; Make a green lunch bag; and First World - Third World*.

The articles are well-written by practising teachers, and inspiring. There are News, Resources and Reviews columns. Its a great, timely and forward-looking magazine, sprinkled with photos and line drawings on matte recycled paper. D.E.M.

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Decapod crustacea of the Atlantic coast of Canada
By Hubert J. Squires. 1990. Scientific Publications, Department of Fisheries and Oceans, Ottawa, Ontario K1A 0E6, Canada. $54.25.

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A world list of mammalian species
By G.B. Corbet and J.E. Hill. 1991. Natural History Museum Publications, Oxford University Press, Oxford and New York. Third edition.

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Standard common and current scientific names for North American amphibians and reptiles. By Joseph T. Collins. 1990. Society for the Study of Amphibians and Reptiles, Oxford, Ohio.

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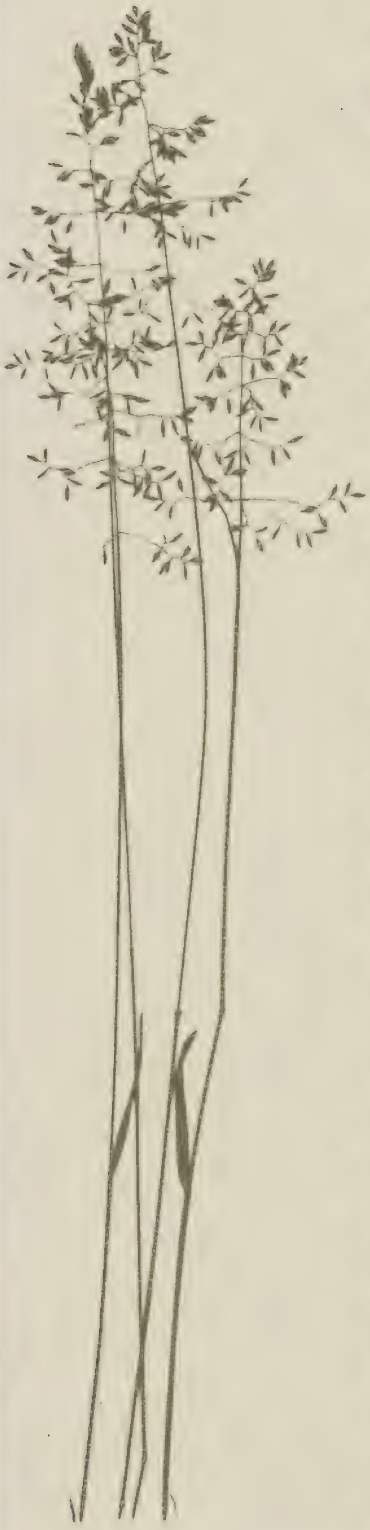
Too many insects, and not enough entomologists
By Roger Lewin, New Scientist, 12 January 1991, p. 33.
The world of insects is in major trouble according to Dr. Quentin Wheeler of Cornell University. Insect species are being driven to extinction at an alarming rate, while the number of entomologists educated to study the surviving species is declining. The dwindling insect world needs experts more than other taxonomic groups.

Wheeler calculates that there are 425 known insect species for every entomologist, while there are only 97 species of flowering plants for every botanist and 7 mammalian species for every mammalogists. The results are even worse if the number of undescribed insect species are compared. While there are some 750,000 species of insects scientifically described and named, new collections from tropical rain forests suggests the true figure of described and new species may be as high as 50 million. The latter figure would give 28,345 species for every entomologist.

For Wheeler, the true goal is not simply to describe and name the remaining species, but to be able to reconstruct the historical phylogenetic relationships among species.



Comparative studies in other branches of biology would suffer in the absence of a credible historical framework. Of course other branches of biology do need the basic identification keys and scientific name if they are to exchange knowledge about behavior, physiology, reproduction and life history. And biotechnologists need that data too, if they are to exploit insects for biological control of pests, extraction of marketable chemicals, and applications of entomology to pollination of crops, forest trees, and the many other uses to which insects can be put.

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Rainforests. A guide to research and tourist facilities at selected tropical forest sites in Central and South America.
By James L. Castner with foreword by Peter H. Raven. 1990. Feline Press, P. O. Box 7219, Gainesville, Florida, U.S.A. 32605. ISBN 0-9625250-2-7.

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Newsletter of the Biological Survey of Canada (Terrestrial Arthropods)
Editor: Dr. H.V. Danks, Head, Biological Survey of Canada, Canadian Museum of Nature, P.O. Box 3443, Station D, Ottawa, Ontario K1P 6P4, Canada. Volume 10, Number 1, 30 pp.

The Biological Survey of Canada (Terrestrial Arthropods) develops and coordinates national initiatives in taxonomic and ecological entomology on behalf of the Canadian Museum of Nature (formerly the National Museum of Natural Sciences) and the Entomological Society of Canada. Their Newsletter communicates information about systematic and faunistic entomology that may be of interest in Canada, and reports especially on activities relevant to the Biological Survey. One of the Biological Surveys several notable achievements was the production and publication of *Arctic arthropods: A review of systematics and ecology with particular reference to the North American fauna* (H.V. Danks, 1981. Entomological Society of Canada, Ottawa, 608 pp.). The Survey has been the model of what can be accomplished with good planning, cooperation between scientists/organizations, and moderate resources.

This issue reports briefly on the status of three current projects of the Biological Survey: Arthropod fauna of springs (editing of proceedings of a symposium has been completed and it is now in press); arthropods of peatlands in Canada (a symposium on this theme will be held in Montreal in 1991); Arthropods of the boreal zone; and Arctic invertebrate biology. News, liaisons and exchanges with other organizations are reported. Larger articles deal with: Arctic invertebrate biology; 1990 Alberta Insect Survey results and discussion; Survey-related activities at the 1990 Entomological Society meetings in Banff; Canadian Biological Information System (proposal to initiate the development of an electronic information retrieval system at the Biosystematics Research Centre to access information on Canadian plants and arthropods; a survey questionnaire is included on the back inside cover in the newsletter); and a list of requests for material or information required for studies of the Canadian fauna 1991.

Animal biotechnology
By Lawrence B. Schook (Editor). 1990. Marcel Dekker, 270 Madison Avenue, New York, New York 10016. ISSN 1049-5398. Volume 1. $150.00 U.S.
This journal covers the identification and manipulation of genes and their products in domesticated animals of agricultural importance.

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Biotechnology: Microbes and the environment
By Steven C. Witt. 1990. Center for Science Information, Briefbook 3, 219 pp. ISBN 0-912005-041. Paperback. $17.50 U.S.
This book is intended to clarify the scientific position in the debate on the environmental release of genetically engineered microbes. The author concludes that despite imperfections in biotechnology products, they present fewer dangers than many widely used chemicals.

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Green is gold: Business talking to business about the Environmental Revolution. By Patrick Carson and Julia Moulden. Harper Collins. 216 pp. with index. $24.95 Canadian.

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Biological control: Theory and application in pest management
By Raghavan Charudattan et al. 1991. Volume 1. Academic Press, 1250 Sixth Avenue, San Diego, California 92101, U.S.A. ISSN 1049-9644. $146.00 U.S.
This journal promotes the science and technology of biological control and includes articles on entomology, plant pathology, nematodology, and weed science.

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World Checklist of Threatened Amphibians and Reptiles
By Brian Groombridge. 1988. Nature Conservancy Council, London. 4th edition. 138 pp.

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The Canadian vegetation classification system: The first approximation
Edited by W.L. Strong, E.T. Oswald and D.J. Downing. Canadian Committee on Ecological Land Classification. National Vegetation Working Group. The Committee, Ottawa. 22 pp.

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Transgenic fish and public policy: Anticipating environmental impacts of transgenic fish. By Anne R. Kapuscinski and Eric M. Hallerman. 1990. Fisheries 15(1): 2-11.

The transfer of novel genes into fishes introduces a number of contentious issues into public policy debate among fisheries scientists and regulatory authorities. This article discusses ecological impacts of such fishes on natural environments. It will be difficult to predict effects because of the

complex interactions among organisms and abiotic resources in aquatic communities. Release of sterilized transgenic fishes would reduce but not eliminate long-term environmental risks. Major res-earch needs for formulation of quantitative risk analysis protocols are identified and a tentative list of items for a position statement on transgenic fishes for adoption by the American Fisheries Society is suggested.

Transgenic fish and public policy: Patenting of transgenic fish.
By Eric M. Hallerman and Anne R. Kapuscinski. Fisheries 15(1): 21-24.
Following granting of the first patent for a transgenic animal, public debate has arisen over a number of contentious patenting issues, including the very patentability of higher life forms. This article discusses policy questions at issue in the U.S. Congress and the U.S. Patent and Trademark Office, and proposes positions that the American Fisheries Society might advocate.

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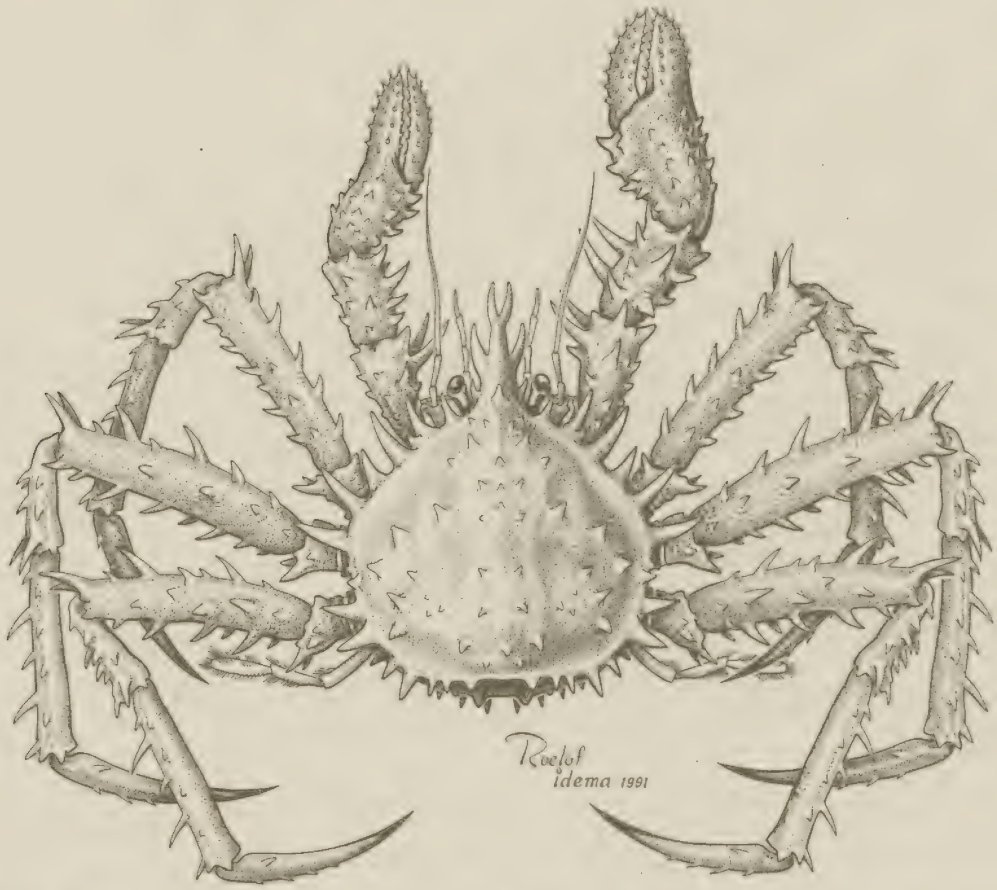
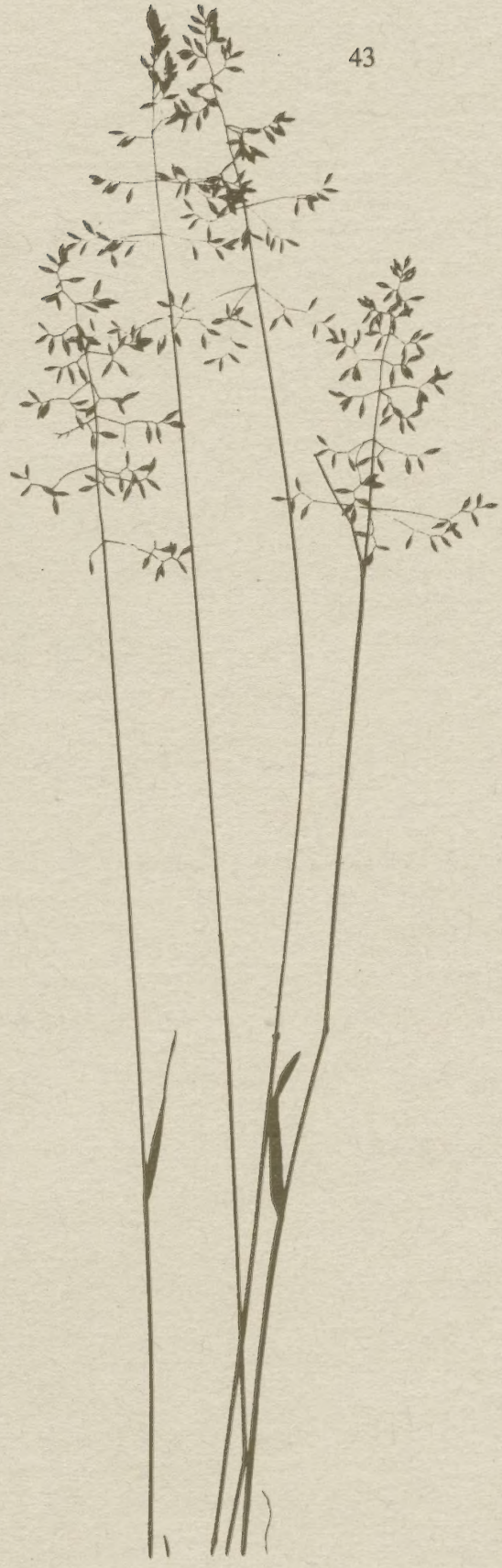
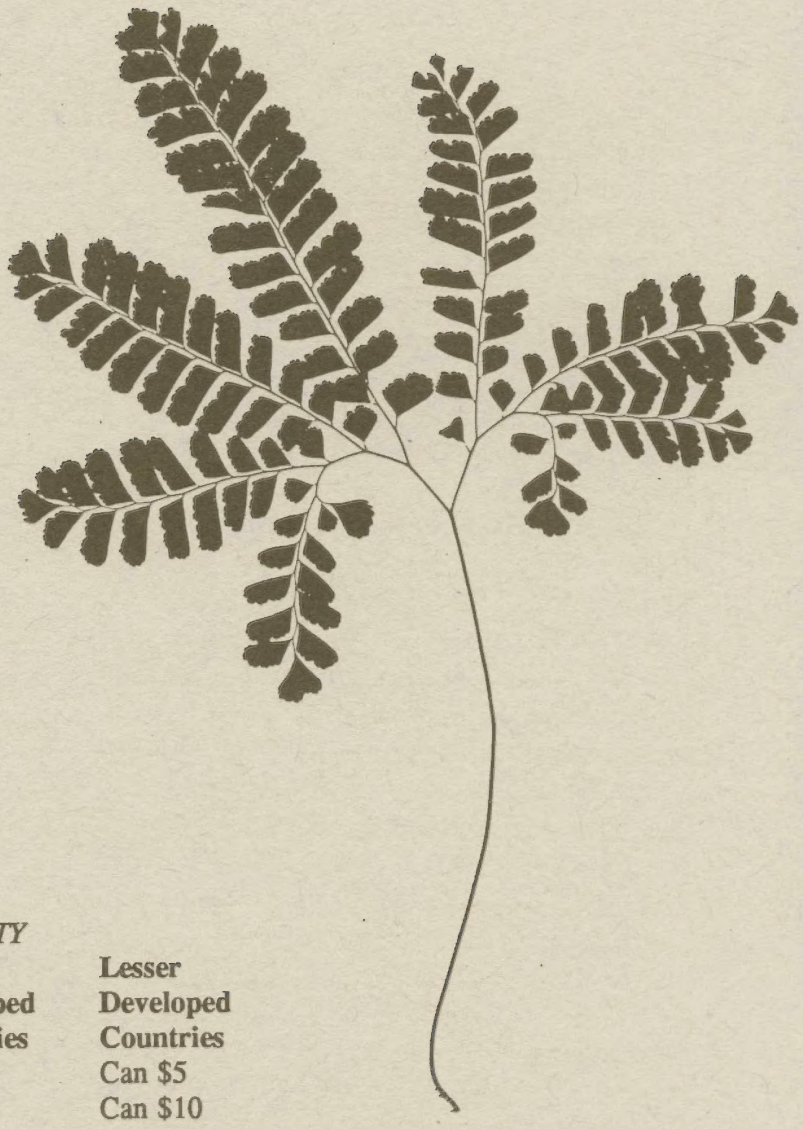


Drawing of the Troll Crab, Lithodes maja (Linnaeus, 1758), is a deepwater crab occurring on the continental shelf and slope between 75 and 790 metres. In the western Atlantic it ranges from West Greenland to Sandy Hook, New Jersey; in the eastern Atlantic from East Greenland, Iceland and Spitzbergen to the British Isles and the Netherlands. Carapace lengths of males reach 105 mm, in females 81 mm. They feed on a variety of bottom life - seaweeds, crustaceans, sponges, small molluscs, etc. (Information from Squire's (1990) ***Decapod crustacea of the Atlantic Coast of Canada*** *(see review, p. 35).*



*Xerograph of Canada blue grass, **Poa compressa**. You can make prints of grasses and plants like this on your photocopying machine. Send us your best. Canada blue grass is a very common introduced species in southern Ontario. It is abundant and often the sole grass on shallow soil on limestone pavements, on thin soil around granite outcrops, beside eroded road embankments, on sandy beaches and arid sandy fields. It has dispersed north to southern James Bay and west beyond Lake Superior. Canada blue grass is a valuable forage grass and dominates on clay plains of southwestern Ontario and the shallow limestone soils of Manitoulin Island where it can easily withstand moderate grazing, drought and winter frost-heaving. It is recognizable by its long clean rhizomes, flattened stems with conspicuous nodes, and short whitish or purple-tinged leaves. It was introduced from the Old World, and has succeeded more in Canada than in its native England. (Information from **Grasses of Ontario** by William G. Dore and J. McNeil, 1980, Research Branch Agriculture Canada, Monograph 26; identification by Dr. Susan Aiken.)*



Xerograph of a Maidenhair Fern, ***Adiantum pedatum*** *L. var.* ***pedatum****. This fern is quite common in the Laurentian area on wooded, sometimes rocky slopes in humus-rich soil (W.J. Cody. 1978.* ***Ferns of the Ottawa district****. Research Branch, Agriculture Canada Publication 974, page 101). Actual size 20 cm.*

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John Muir

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